DESIGNING AND DEVELOPING AN ONLINE SERVICES SYSTEM: A CASE OF MAYBANK STUDENTS' RESIDENTIAL HALL

A Thesis submitted to the College of Arts and Sciences in full fulfillment of the requirements for the degree of Master of Science

Universiti Utara Malaysia

by

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ABSTRACT

When internet services became cheap and available in the world, many organizations use it to enhance its benefits and to communicate with users in anywhere and anytime. Because that most universities used the facilities in online services to increase their abilities in organizing work. Online services are not limited to use in the universities for e-learning only. Although, the students who interact with online services increasingly, a common problem is that students online services need more efficient interaction. In other words, the sites lack usability; this research to design and develop an online services system for Maybank Students' Residential Hall aid to solve this problem and to support the communication between students and residential hall staff.

Key word: Information Technology, Online Services

ACKNOWLEDGEMENT

By the Name of Allah, the Most Gracious and the Most Merciful

First of all I thank to Allah for giving me the strength to complete my master generally and this thesis specifically.

I would like to say big thanks to everyone gave me a minute of his/her time to help me finishing my work. I hope to be as good as they want. I would like to thank my supervisor Dr. Shafiz Affendi Bin Mohd Yusof for his advice and supervision during the preparation of this project. I'm gratefully and deeply thank him for his support and cooperation as being equipped to provide his best help.

Furthermore I would like to thank all the dear members of my family, especially my mother and father (May Allah have mercy on their), my wife and all my brothers and sisters for their kindness and support, as well as all lecturers at the faculty of Information Technology, that they gave me all the information for completing the requirements of this study, especially my evaluator Mr. Mohamad Amir Abu Seman for his advice and the principal of Maybank Students' Residential Hall Mr. Azizan Husain. "My Allah blesses all of them".

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LIST OF ABBREVIATIONS

ARPANET	Advanced Research Projects Agency Network
ASP	Active Server Page
CAS	College Arts of Science
E Business	Electronic Business
E Learning	Electronic Learning
HTTP	Hyper Text Transfer Protocol
IS	Information System
ISO	International Organization for Standardization
ISP	Internet Service Provider
IT	Information Technology
MADB	Microsoft Access Data Base
MBA	Master of Business Administration
MSc	Master of Science
MUG	Microsoft Usability Guidelines
NSF	National Science Foundation
Online Services-MSRH	Online Services System of Maybank Students' Residential Hall
OU	Open University
RRS	Response of Request Schedule
SPSS	Statistical Package for Social Sciences
UG	Usability Guideline
UML	Unified Modeling Language
UUM	University Utara Malaysia
WWW	World Wide Web

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The online services appeared to increase the communication ways between users and organizations. They represent the easier and efficient services. We can notes that these services appeared after the developing of communication technologies.

The history of communication technologies includes mail, the telegraph, the telephone and the internet. However, the internet is the latest in a long succession of communication technologies (Odlyzko, 2001). According to Preece (2001) the term 'Online Community' means different things to different people. This case means there is no accepted definition to this term. In other side the researchers defined Online Community in general is: a group of people who interact in a virtual environment (Preece & Krichmar & Abras, 2003). The problem with the term “online community” has been determined is that it refers to a big domain of online activities (Preece & et al, 2003).

These communications technologies have played an important role in providing facilities to people in different aspects of life. The spread of the internet was the biggest role in the process of progress and thus to be deployed a lot of sites on the internet as well to

achieve greater interaction between users and owners of these sites, whether personal, governmental sites or organizations, etc. But researchers notes that the email, still the most frequently used communication tool on the Internet (Project, 2002). Online services cover most life domains, such as e-selling, e-business and e-learning. Therefore, the online services are available to students in different fields in many universities in the world. Spencer (2001) pointed out the importance of providing online services to the students, where the Internet is the place to turn for all their needs. Integration of online services for students in all institutional e-business strategy of our institutions is crucial.

For example, many students' life and students' activities offices give students' organizations the opportunity to promote their Web pages with information on their mission and goals, membership requirements, and other services. In many colleges, students can submit online forms to reserve club meeting space on campus. In other universities such as Southeastern Louisiana University offers an online carpooling service (Dalziel and Payne, 2001). Students can request online tutoring services and receive general advice from students who have taken online courses at the college, this service available to students in Weber State University in Ogden, Utah (Dalziel and Payne, 2001). Also some universities provided students online services, the students of these universities can get the following facilities from online services:

- Search, register, and drop classes (before finalizing);
- Pay for and finalize student classes;
- View his/her office grades and request a transcript;
- Check student financial aid information;

• Access online services such as student web mail, CareerLink, online classes, DU library services and databases; and

• Receive important announcements and alerts from his/her campus and the university (Davenport University, 2009).

This study intends to design and develop an online services system to students' residential hall: a Case of Maybank College (Online Services-MSRH) at University Utara Malaysia (UUM). UUM has one of the most charming and modern campus in the northern region. UUM provides lodgings to all its students. For this purpose, UUM has 15 student residential halls that can accommodate approximately 20,000 students. The residential halls are MAYBANK, MAS, TENAGA NASIONAL, TRADEWINDS, PETRONAS, EON, MISC, KUMPULAN GUTHRIE, PERWAJA, TM, PROTON, YAYASAN ALBUKHARY, BANK MUAMALAT, BANK RAKYAT and BUKIT KACHI 2 (University Utara Malaysia Student Guide, 2008/2009). According to the principal of Maybank Residential Hall: Maybank College for married students, it consists of 16 buildings, now 499 students' resident, 68 of these students are in the bachelor program, 283 of these students are in the master program and 148 of these students are in the PHD program. The students who live in the College are far from different countries because this college for both local and international students. Table 1.1 illustrates the countries of the resident:

Table 1.1: The Students Countries

Number	Countries	Sum
1	ALGERIA	4
2	AUSTRALIA	1

3	BANGLADESH	9
4	CHAD	2
5	CHINA	8
6	ETHOPIA	1
7	INDIA	1
8	INDONESIA	50
9	IRAQ	39
10	JORDAN	76
11	KEMBOJA	1
11	LIBYA	120
12	MALAYSIA	24
13	NIGERIA	5
14	OMAN	2
15	PAKISTAN	3
16	PALESTIN	23
17	SOMALIA	9
18	SYRIA	5
19	THAILAND	40
20	TUNISIA	1
21	UZBEKISTAN	5
22	YAMEN	70

1.1 Problem Statement

Conventional interaction system for students with the staff of Maybank Students' Residential Hall faces many challenges, which are grouped into availability and efficient interaction. In the research case study, availability problems come into sight because of the office work hours and the vacations that come during the working days. The efficient interaction is one of the most important things for the students who stay in Maybank College. Therefore, there is no efficient interaction between the students and the office of Maybank College.

Actually the students and office both of them lose time and effort. When students want to request something, they have to go to Maybank College office and submit their request such as when students need furniture or maintenance staff. Therefore, the students do not know when exactly they should wait for the maintenance staff to come, so they either lose their request's response if they leave their rooms or lose their other issues. Because of announcements within the office would be difficult to observe for most students. To overcome these challenges the need to develop online services, "anywhere, anytime," that student's can access to this website is required.

According to Burgstahler (2008) "The accessibility of admissions offices, libraries, computer labs, counseling and tutoring centers, and other student services increases in importance". Also I met the principal of Maybank College Dr. Shahruddin Hashim about the proposed system, he said" this website will be useful if students of Maybank College respond with the website. However, we confirm that this proposal will benefit

and useful to both parties in order to improve the interaction between Maybank College and the resident students".

1.2 Research Questions

The research questions for this study are:

1. How can we design and develop an online services system that will support the communication between the resident students and office of Maybank College?
2. How can the usability improve the online services between the users and system?

1.3 Objectives

The main objective is to propose an online services system: a case of MayBank students residential hall are:

a. Design and develop online services by using dynamic website language (ASP.Net) and requirements of Usability Guidelines (UG) to support communication between the resident students and staff of Maybank College.

b. The usability will improve the online services between the users and system by providing efficient interaction between them.

1.4 Limitation and Scope

One of the most important things, that need special care and facilitation services in all universities, is the students' residential halls. Students' Residential Hall of Maybank at University Utara Malaysia that has been chosen as a sample to design prototype. However, the whole scope can be implemented to cover all the students' residential halls at UUM. Users who deal with this Web site are the staff of Maybank College and resident students.

1.5 Significant of Research

This study will provide many benefits as bellow:

a. Offering student online services will decrease staff workload and increase the student interaction outside of the students' residential hall.
b. To facilitate the interaction between office and resident students by supporting them to achieve their requirements and to get more organization to the procedures followed by students' residential hall.

The research is trying to achieve the following points:

- Save time and efforts that is represented in the resident students going to the office for submitting their requests. This feature can be applied by using online request form.

- Design Response of Request Schedule (RRS) contains the date and time for responding of request. RRS will be used to inform the resident students for the implementation date of their requests.
- Online announcements services help the office to inform resident students about its announcements.

1.6 Organization of the Research

This research consists of six chapters; the following contents represent an overview of each chapter in this research:

Chapter one the first chapter concerns with the introductory to the study overview.

Chapter two represents literature review of the description of the WEB services in general, user needs and usability requirements and online services that are used in many universities in the world.

Chapter three focuses on the methodology used in this project in order to achieve the purposes of the study. The methodology that is used for this research called design research methodology which is proposed by (Vaishnavi & Kuechler, 2004). This methodology are consists of five main phases; they are the awareness of problem, suggestion, development, evaluation and conclusion.

Chapter four will mentioned on the site design and development that is based on the proposed system by using the methods described in the third chapter, while in Chapter five the results and outcomes of this study.

Chapter six will contains the conclusion of the study, future work, researcher recommendations, study's limitations and study's contributions.

1.7 Summary

In this chapter a brief background about the study**.** It includes a problem statement, research objectives, the scope and limitation in this research and research significance. The objectives of this research are to design an online services prototype for MayBank students' residential hall (Online Services System-MSRH) and to develop the prototype and evaluate it by using the Usability Guideline.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The history of the Internet began in 1969 as a scientific and military research program called ARPANET (Advanced Research Projects Agency Network). This program composed four computers, three in California and one in Utah, the experiment was to develop the first system of transfer of information in the event of network outages every day, and perhaps time in times of global thermonuclear war (this was the Cold War, after all). Packet-switching a system enables small packets of data to be sent independently of each other on the destination computer, enables the reliable transmission of data, and is the foundation of the Internet today (Arteaga, 2005).

In 1985, ARPANET was presented to the National Science Foundation. NSF increased the network by opening five new supercomputer centers to the Internet an effective tool for government agencies and educational institutions to share information. Hobbyists have joined the Internet and used to send e-mail to another, and access of university libraries and government databases. The Internet has been opened for business and commercial interests around 1990. At the born of World Wide Web the Graphics, photos, text, sounds, animations, video, interactivity were found.

Companies called Internet service providers (ISPs) provided the public with access to the Internet, usually for a monthly fee. In 2005, more than one billion people worldwide connect to the Internet of 11.5 billion web pages every day (Arteaga, 2005).

Widespread of the Internet has helped the owners of companies to provide the online services to customers, as well as these services became used in all aspects of life, including universities.

This chapter discusses the online services systems that offer important services to students to the universities. In the primary stage we have made a brief review about the web services in general. Then we jumped into the user needs and usability requirements concepts. Finally, the study focuses on the review regarding the online services at the universities.

2.1 Web Services

The quick progress of the internet based World-Wide Web (WWW) and its constantly growing popularity has motivated many companies to use it as a channel to transacting and servicing the customers. One of the main goals of the web services is to increase the interaction between organizations and customers, as well as to shorten the time and effort of both the organizations staff and the client at the same time.

On this basis, developed countries required ensuring the construction of electronic government online services directly to the citizens.

For example, Malaysia is one of the countries provides online services of the various areas for providing facilities to the citizens. It aims to improve convenience,

accessibility and quality interaction with citizens and businesses. At the same time, it improves the information flows and processes of the government to improve the speed and quality policy development, coordination and execution (Mait, 2008).

2.1.1 Definition of Web Services Technology

Some researchers referred to a problem with the term "Web Services"; there is no single agreed definition of what the term itself actually means (Turnera and et al, 2004). According to Aissi, Malu and Srinivasan (2004) the definition of web services is the dynamic interaction between software components, these components use the standard internet technologies. Another researchers defined web services is "a set of standard technologies that allow applications to expose and consume functionality independent of operating system, programming language, and hardware" (VanLengen and Haney, 2004). Wilkinson (2005) defined web services are the interface between a service provider and a consumer is based on Internet protocols and messaging is achieved using XML. Pang, Yang and Bian (2008) gave this definition to web services "A Web Service is programmable application logic accessible using standard Internet protocols". If these definitions were examined for the Web services, would be found them close in meaning.

2.1.2 Previous Studies Used Online Services Application

According to Pinhanez (2007) the definition of an online service, is an application where:

1. The user does not control most means of production.

2. The user (self, belongings, information) is a significant part of the input to the production process.

Figure 2.1 illustrate the architecture of an online service application

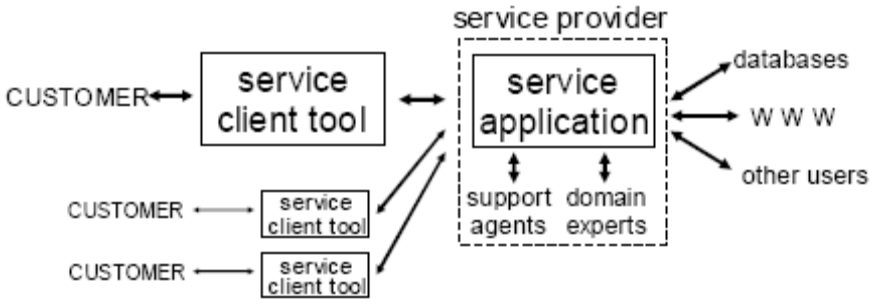


Figure 2.1: Architecture of an Online Service Application (Pinhanez, 2007)

Many organizations used online services to enhance its work. Also it used online services to increase the interaction with customers to get more benefits and availability to user in 24 hours in seven days.

Callahan and Koenemann (2000) used Electronic Product Catalogs. It was very important during the increasing in electronic commerce. However, those researchers have given many benefits in case of using online catalogs for manufacturers. These benefits are: lower distribution costs, the possibility to include more detailed information about the product, frequent updating etc (Callahan and Koenemann, 2000).

Al-Mudimigh (2007) evaluated the achievement of the e-business model and e-business strategy applied by Citibank in the United Arab Emirates in offering its retail Banking Service through the internet; Citibank Online. He referred to the important of e business as a branch of online services when he said "E-business relies on the development of new business strategies based on networks. The world has become increasingly inter-

connected via telecommunication networks and computers. These offer fast, flexible, and cost-effective ways of doing business". During 2001 to 2004, the researcher examined the financials for the performance of the e-business model and e-business strategies of Citibank. The results of this study as illustrate in table 2.1:

Table 2.1: Number of Active Citibank Online Customers (Al-Mudimigh, 2007)

	2001	2002	2003	2004
No. of active customers	4000	5000	6000	7500
No. of transactions	72,000	90,000	112,000	150,000
Transactions value	$656,000	$820,000	$984,000	$1,230,000

The business values greater than before to represent that the customers are to react more comfortably by managing their money on the Internet. So the major reason in the launching of online banking services is to provide the customers with an alternative, more responsive and with less costly choices.

2.2 User Needs and Usability Requirements

At the beginning, this section refers to the concept of "Usability" in general.
Then it focuses on the previous studies that have been used the usability requirements to evaluate many sites on the Internet.

2.2.1 Concept of Usability

Gaffney's (2000) defined usability as the scope to which a system supports its users in finishing their demands efficiently, effectively, and satisfactorily.

Efficiency is a gauge of the length of time, and the amount of resources, we use in finishing a task. A usable system enables users to complete a task with the minimum of fuss, without having to learn new techniques unnecessarily, and without having to expend more effort than users need.

Effectiveness is a gauge of how well users complete tasks. A usable system enables users to complete their tasks to high standard.

Satisfaction is a gauge of the scope to which users are pleased with their development in completing a task. A usable system asks for the right amount of information or input, provides useful help when required, and saves users effort.

Also he maintained to a common set of 'heuristics' to a usability of system are:

Navigation The application must have a clear indication of current location, and are there clears navigation elements offering the opportunity to go to other pages of the system.

Help & Support The application must given clear advices in case of need and the workflow of the system supports the users to fulfill their demands.

Error handling The errors must avoid as much as possible. When errors occur, the system gives clear messages.

Consistency The system must have good consistency between its parts, and this consistency in the standard.

Control The users need to have control of the application.

Visual clarity If the system is attractive, it will provide visual satisfaction to the users.

Language The language use in the system must be appropriate to the language of the users.

According to other researchers usability can be defined in terms of how can the users easily and efficiently, learn, remember, use and recognize the product (Shiratuddin, and Hassan, 2003). The International Organization for Standardization (ISO) defined usability through the attributes of users' interactions with software products in specific contexts of use: efficiency, effectiveness, and user satisfaction (Murphy and Bureau, 2007).

2.2.2 Previous Studies Used Usability Requirements

In this related works many of the researchers used Usability Guidelines to evaluate online services.

The evaluation of a website is very vital step in information system; this step aims to improve the quality of a website (Bygstad and Sørum, 2007). However, there are many challenges are wanted to evaluate the online services. One challenge is that the website evaluation takes time and more costly. The second challenge is the website evaluate depends on the method used and the individual evaluator (Bygstad and Sørum, 2007).

Callahan and Koenemann (2000) have conducted a comparative study of the usability of hierarchically structured and zoomable Electronic Product Catalogs (EPC). After evaluating 16 hierarchical EPC available online in that time they constructed a test search interface and used it for comparison with InfoZoom. They showed the novel interface to 26 users, who were new to the InfoZoom Interface, but familiar with the Web environment. Performance on both types of interfaces was assessed in terms of search speed, accuracy, efficiency, and user satisfaction. Both interfaces had positive

evaluations, but behavioral data and performance data suggested that users valued their interaction with InfoZoom more.

Amer (2006) investigated usability of online library systems at University Utara Malaysia (UUM). He evaluated the usability of Sultanah Bahiyah Library's web systems by investigating the aspects of simplicity, comfort, user friendliness, control, readability, information adequacy/task match, navigability, recognition, access time, relevancy, consistency and visual presentation. That study focused on the examined user's views about the usability of digital libraries – current and perceived importance. A sample of 45 students from a total of 85 students of Master of Business Administration (MBA) had been chosen.

Bygstad and Sørum (2007) referred in their research to Norwegian School of Information Technology that evaluated websites by using usability requirements. In 2005 the Norwegian School of Information Technology used a heuristic framework based on various usability criteria when it was contacted by the Norwegian economics magazine Økonomisk Rapport to help with web site evaluations for a national competition on the best web sites. In 2006 the Norwegian School of Information Technology used bachelor students to evaluate the 108 web sites, but the result was not quite satisfactory because the evaluation of websites depends on the individual experience of the evaluators (Bygstad and Sørum, 2007). They used the Microsoft Usability Guidelines (MUG) as an establishment, and designed and assessed a tool called Farmandtesten. Their results are indicate that a structured tool for web site evaluation speeds up the process and increase the reliability of measurement in a web.

The success of online services heavily related to the customer knowledge by using the web site interface. That interface provides a mechanism for customers to search for/access content, conduct transactions and to communicate (Massey, Khatri, Montoya-Weiss, 2008).

Massey and et al (2008) used Microsoft Usability Guideline (MUG) to evaluate the websites in their research. Also they discussed the consumer behavior concerned with customers' beliefs. They focused on four beliefs - optimism, innovativeness, discomfort and insecurity. The results had been involved 215 subjects, which examined the influence of customer characteristics on usability requirements.

2.3 Online Services at Universities

The online services covered most fields at universities to serve universities staff and students. Student life administrators have become increasingly innovative and creative. While online, student life and student activities are not easily available in 1998, many "most wired" colleges and universities are beginning to recognize the need to provide these services (McRae and Lumsden, 2001). According to Crawley (2004) the previous year's witnessed a starting of the use of the Internet technologies in order to provide the students with the required services on both inside and outside the campus.

Some of the researchers classified online services at universities into:

- Online Library Services: Elements of Style.
- Tutoring Online to Retain Students and Promote Success.

- Providing Student Life, Bookstore, and Health and Wellness Services Online (Dalziel and Payne, 2001).

The online services used in Open University for e-learning purposes. The Open University (OU) is a world leader in the use of computer conferencing and online services for distance education (Aldridge, 2001).

In other side there are many institutions use Web-based course management systems that offer many benefits and functions for universities and students. While the number of the course management systems is increasing rapidly, most have elements that allow universities and students to interact within the online learning environment (Dalziel and Payne, 2001).

Paulsen (2002) discussed in his research the online education and the common terms used to refer to it. Some of them are: virtual education, Internet based education, web-based education, and education via computer-mediated communication. After that he defined e learning as "interactive learning in which the learning content is available online and provides automatic feedback to the student's learning activities". Finally, the researcher referred to online education systems models that represent all systems that support online education. He discussed two alternative models for online education systems, these models are:

- The Jigsaw model for online education systems.
- The Hub model for online education systems.

A university portal is very important web site that the staff and students interact with it; it's using information from university databases. A well-implemented university portal can offer a number of benefits to a user of the system (Zhu and Wang and Ju, 2004).

Syracuse University Information Studies provided student services on the Internet using a course tool, which had led to an increase in student satisfaction. Using the online course tool that is used to deliver online classes, no additional resources needed for web development, staff training and software. The advantage that the students got was to have the opportunity to gain access to academic counseling and other services to students through the same portal as their online courses (Allen and Brown, 2005).

A more recent trend in online teaching and learning is the adoption and integration of web conferencing tools to enable live online classrooms and recreate the ethos of traditional face-to-face sessions (Sabin and Higgs, 2007).

The nature of online services is continually changing. Universities have been at the front position of this change, with university websites increasingly acting as a portal for a wide range of on-line transactions for a wide range of stakeholders (Tate, Evermann, Hope and Barnes, 2007).

Yang and Zho (2007) investigated the issues of development and marketing strategy for all online textbooks sale, the Internet has given more options for college students to buy and sell their books in recent years. They collected data through a web site evaluation and examination and a questionnaire survey of selected universities. The objectives of the study were to investigate the marketing strategy online college textbook business in terms of price, time, availability and the likes. Furthermore, is to identify key issues and challenges for the college online textbooks in promoting online sales sites textbooks. Additionally is to examine the college students preferably in their decision to purchase textbooks regarding the options for online sales of textbooks. Data collected from this

study showed that there is a significant gap between companies in strategic marketing and student perceptions of their final purchase decision.

Pang and et al (2008) introduced and implemented a Web Services based online Training and Exam System. This system consists of five modules which are System Management Module, Item Bank Management Module, Online Training Module, Online Exam Module and Statistical Analysis Module.

According to Pang and et al (2008) the advantage of this system is: Independence, Flexibility, Stability and Security.

Nusir (2008) developed a management information system for postgraduate of University Utara Malaysia (UUM); this system provides service that contains all operation about final project operation system. The goal of this study is to help the Graduate departments in accomplishing all the requirements of final project for post graduate students. He tested the system by taken a sample of twenty members to examine the usefulness, the benefits and the development of the system. The final result after analysis the data that the sample members found the system would achieve their major demands.

Al-Zoubi, Alfawaer and Al-Zoubi (2008) designed a Web-based evaluation management system for the College of Arts and Sciences (CAS) at University Utara Malaysia. The problem statement of that research concerned with the manual system for the final project of students. The final project was evaluated in two parts; first part is representing 40% of the total mark and evaluated by evaluators. Second part was representing 60% of the total mark and evaluated by the students' supervisor. Both the evaluators and supervisors had to fill up the evaluation forms and submit them to the office. Their study

proposed a web based evaluation management system to change the current system used by the evaluators and supervisors. The proposed system gave facilities to both evaluators and supervisors to fill up the evaluation forms through the Internet to save time and resources over traditional paper and pencil scan sheet method.

2.4 Summary

This chapter highlights the previous studies, which are relevant to the subject of this study. The chapter has been divided into three sections. The first section concerned with the web services in general. The second section focuses on the requirements of the usability to design the sites that offer services to users. Finally, the last section deals with the online services offered to the students in the universities.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

Research methodology defines what the activity of research is, how to do it, how the researchers can measure upgrading, and what represent success. This chapter describes the methodology that used in this study. Research methodology is more than just collections of methods to perform a research; it is a systematic way to solve the research problem (Rajasekar and Philominathan, 2000).

Design research aims to explain, understand and improve on the behavioral of aspects of information system by analyzing the use and performance of designed artifacts, such as algorithm (Zhu, 2007).

3.1 Design Research Methodology

The methodology used in this research is the design research that is considered to be accepted among many researchers in Information System. Many researchers used this methodology in designing and developing web services. For example, Weerd (2005)

stated that the design research methodology for performing research in information systems used for WebManager implementations.

According to Vaishnavi & Kuechler (2004), the design research methodology includes the major steps as shown in Figure 3.1 these phases are:

- Awareness of Problem
- Suggestion,
- Development
- Evaluation
- Conclusion.

Design research in IS aims to building and evaluating IT artifacts to meet business needs.

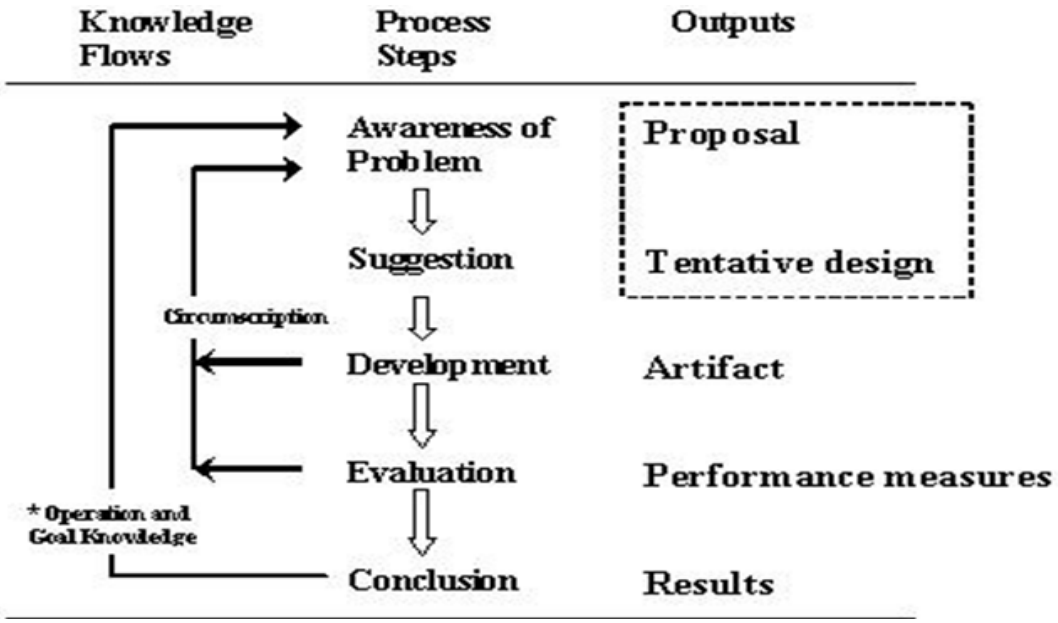


Figure 3.1: Design Research Methodology (Vaishnavi & Kuechler, 2004)

3.1.1 Awareness of Problem

In this stage of methodology the researchers identified the requirements of the prototype; requirement identification is a most important phase in the prototype, and a major thing in the methodology is the understanding of the objectives and the scope and also the problems. Therefore, the awareness of the problem is that the services of Students Residential Hall using online services any where any time. In this stage the problem statement, the objective and the scope would be clear enough.

3.1.1.1 Collect Data

Data collection is vital in producing a requirement model and prototype that actually fulfilled users' needs. The interview method used to collect data in this research. The researcher conducted meeting with the head of Maybank college office Dr. Shahrudin Hashim this process was implemented through face to face interview. This interview has been taken as a sample, to know what exactly the services they offer to resident students in college and also to identify the weakness of the services. Also to know what is the office' needs from the online web system. Moreover, I discussed with the many resident students in Maybank College about their demands from the office.

Table 3.1 illustrates the functional requirements that the system must contain it.

Table 3.1: Functional Requirements

Requirement	Description
Requirement 1	The system must allow to admin Editing students' information.
Requirement 2	The system must allow to admin searching students' information.
Requirement 3	The system must allow to admin Editing announcement information.
Requirement 4	The system must allow to admin view and response to students' requests.
Requirement 5	The system must allow to students to send their requests.
Requirement 6	The system must allow to students to view the announcements of office.
Requirement 7	The system must allow to students to view the details of office response to their requests.

3.1.2 Suggestion

The suggestion to solve the problem in this study is to design web site to enhance the interaction between the staff of students' residential Hall and the residents, so the students can easily request anything. The output of this phase is the temporary Design.

The analysis and design of the system includes UML diagrams. The UML diagrams contain the use case diagrams that can be detailed into sequence diagrams for each use case, and class diagram.

3.1.3 Development

Web applications' designers have facing many challenges during development stage of the systems. Most of these challenges are with data handling, organizing, or structuring of the web applications (Sridaran, Padmavathi and Iyakutti, 2009).

In this study the prototype developed by using ASP.net programming language environment. Microsoft.NET Framework provides developers with the opportunity to create and deploy applications and services via the Web. These services can facilitate communication between clients and .NET application servers (such as database servers and so on) through the use of XML queries issued by the client. This environment is attractive to developers because it is a language-neutral environment that can deliver content to end users, regardless of the platform in use (Road, 2002). In this level the online services for students' residential hall Prototype developed. Also we developed the prototype by using requirements of Usability Guidelines. "Usability" describes the ability of customers to use an online form to full advantage (so that the technology assists and supports users), and to achieve business objectives (Department of Industry, Tourism and Resources and The Hiser Group Pty Ltd, 2006). Online development is necessary part of making Internet services strong to unexpected events, and changes in system requirements (Chen, Kıcıman and Brewer, 2003).

In January 2006, the Department of Industry, Tourism and Resources (DITR) commissioned The Hiser Group to develop a set of general guidelines to assist their clients with designing useable and useful online forms. According to (Department of

Industry, Tourism and Resources and The Hiser Group Pty Ltd, 2006) the Usability Guidelines for online application forms are:

3.1.3.1 Overall Customer Experience

3.1.3.1. 1 Make it Easy for Users to Find the Forms

a. The designers need to provide short cuts from the home page or main menus of their web site to a page describing the form and its purpose.

b. The designers need to provide a URL that is simple, short & memorable. These two points will support a quick efficient workflow and increases traffic to the form.

3.1.3.1. 2 Create a Good First Impression

a. When possible the designer must avoid using embedded fonts in PDF files.

These fonts enlarge the size of the file. Fonts that are available in Adobe Reader and not embedded are:

- TimesRoman, TimesBold, TimesItalic, TimesBoldItalic
- Helvetica, HelveticaBold, HelveticaOblique, HelveticaBoldOblique
- Courier, CourierBold, CourierOblique, CourierBoldOblique.
- Symbol, ZapfDingbats.

This point will less time to download and render a form.

b. To support the workflow of the website the designer needs to tell the users about the number of steps or pages in the form and how long it will take to complete their tasks before they asked to start entering the form details. This can be done when the form is consisted of more than one page.

3.1.3.1. 3 Encourage User Trust

a. The designer needs to review spelling and grammar regularly. Also the designer must regularly review links throughout the form to rectify any broken links.

b. The system must allow to users to print the details of information to read it later.

3.1.3.1. 4 Encourage User Interest and Feedback

a. The designer needs to advice users about any information needed to complete the forms.

3.1.3.1. 5 Create a Flexible Design Which Will Support the Needs of Different Users

a. The website provides a link to allow users to correctly print any page within the form on A4 paper.

3.1.3.2 Moving around the Form (Navigation, Workflow & Orientation)

3.1.3.2.1 Make it Easy for Users to Understand the Workflow and Structure of the Form

b. The system must provide feedback to confirm the application form that has been received.

c. Also the system needs to provide clear buttons for logical next steps to complete other common tasks.

3.1.3.2.2 Make it Easy for Users to Identify Next Steps (Links and Buttons)

a. It is best manner if the system avoids using 'Submit' as some users feel this language is this too technical, unfriendly or authoritative.

3.1.3.2.3 Provide Efficient Navigation within the Form

a. The system must provide navigational aids (e.g. links, table of contents) for long forms containing a lot of text and fields.

3.1.3.2.4 Provide Users with a Quick, Efficient Workflow

a. The system should minimize the amount of data users that are required to enter. Also it must avoid asking the users for the details that slow the workflow if they are not directly related to the main user goal.

b. Users should not have to read and complete or chose to ignore any irrelevant details.

3.1.3.3 Reading the Site (Written Content)

3.1.3.3.1 Style of Language

a. The designers' of web site need to ensure all text and labelling used throughout the form as brief as possible without losing clarity of meaning to the users.

b. Also they use simple language and avoid computer or technical jargon, euphemisms or trendy overused clichéd words. (For example, use 'send' instead of 'submit', and use 'required information' instead of 'mandatory fields'). The system must define any jargon or technical terms that cannot be avoided.

c. The system must used positive language for messages and errors and do not blame the user.

3.1.3.3.2 Grouping of Information

a. Each page should contain related data.

3.1.3.3.3 Make it Easy to Complete the Content

a. The design of screens must do not contain instructions and the descriptions will not be needed. Users do not need to read instructions and they go directly to the data entry fields and screen controls.
b. If the designer used screen controls that would be appropriately and consistently more suitable. For example:
   • Drop-downs for select single items from a list of related items.
   • Radio buttons to select one from mutually exclusive options.
   • Check boxes to allow selection of multiple options.
c. The best websites that provide reasonable default text wherever possible.
d. In the system do not make users remember any information from a previous page or reenter it again.

3.1.3.4 Viewing the Site (Layout & Presentation)

3.1.3.4.1 Page Layout

a. The order of the content within each page should support a workflow that allows users to logically and efficiently complete the tasks.

b. Position the most important information at the left and top centre of a page. All fields should have field labels that appear before the related field when reading left to right.

c. The designer needs to ensure page titles and sub-headings stand out from standard page text by using a larger font size.

e. The website uses a unique, easily identifiable visual style for important text consistently throughout the form, For example:

- Use red bold text for error messages.

f. Data entry fields or boxes where users can enter text:

• Must be wide and high enough to allow users to see the information they have entered.

• Should reflect the anticipated length of the user's input.

• Should be presented in a way that is natural for them to interact with, and minimizes error.

3.1.3.4.2 Use of Images

3.1.3.4.3 Readability

a. Is very important point to the designers to ensure that the text is legible at all supported screen resolutions i.e. use a standard font size that is equivalent of 10-11 point.

b. Also must avoided excessively small font sizes for blocks of text, legal notes or footnotes.

c. Avoid using blocks or rows of text that is all capitals or all italics because users generally find this far more difficult and slow to read (e.g. legal notes).

3.1.3.4.4 Accessibility

a. The ability for all users to access and complete the form is an integral part of achieving usability best practice.

b. The system need to provide descriptive labels for all form buttons, fields and images.

3.1.3.4.5 Appropriate Use of Colour

a. The system must use appropriate colour increase the interaction of users with the website.

b. Also the designer must avoid large areas of complementary colours as this can cause eyestrain.

3.1.3.5 Interaction Design

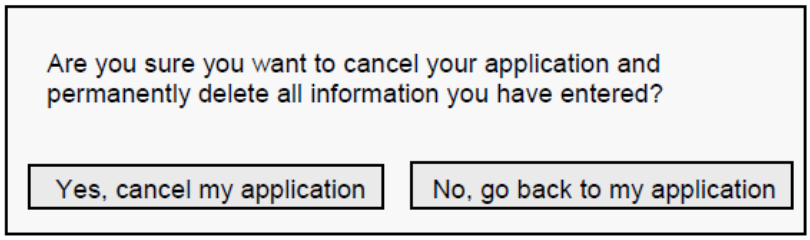
3.1.3.5.1 Error Handling

a. The designer must indicate to the users in case of any fields are mandatory:

- Display text immediately below the page title on each page that contains mandatory fields e.g. '* indicates required information'. Ensure the symbol is large enough to stand out when scanning the page.
- Use the same '*'symbol at the beginning of the field label for mandatory fields. Consider using a unique colour for this text to make it easier for users to scan the page for the mandatory fields.

b. Also the design of the website must have more flexibility to check data for errors when details are saved (e.g. as each page is completed or at any logical point in the workflow) to Increase user confidence they are completing the form correctly.

c. The (Online Services-MSRH) displays the dialog box after choosing the cancel from the form without saving the information. That can be done to confirm the action or allowing me to return back to the application form. This dialog box could read something like:



d. Data entry error messages at the top of the page should be concise and comprise two separate parts.

• Statement an error occurred including the number of errors (if there are multiple)

• Instruct users about what they need to do and to which field(s) to correct each error.

3.1.4 Evaluation

Web site evaluation is an important step in IS development to assess and improve the quality of the web presence of a company or government body. One challenge is that web site evaluation is time consuming and expensive. Another challenge is that the assessments of web sites may vary, depending on both the method used and the individual evaluator. The researcher evaluated this prototype by distributing questionnaire to the students who resident in Maybank College (The form of the questionnaire attached in appendix A). The questionnaire which is used in this study has been changed to be adopted depends on Usability Guideline of Department of Industry, Tourism and Resources and the Hiser Group Pty Ltd.

3.1.5 Conclusion

Designing online services for students' residential hall at UUM used to support the students needs that is a critical perquisite for success. However, if we actualized usability requirements in our research, it would make the web site more efficient and easy to use.

This chapter explained the methodology that has been used in this research. The goal of this research is to enhance and facilitate the communication between resident students and students' residential hall staff.

3.2 Summary

This chapter highlights the five phases in research design methodology, which are suggested in this study. The researcher used this methodology to improve and to test the prototype. Furthermore, the development of the system will be presented in the next chapter.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter covers the design and implementation of the Online Services System: a Case of Maybank Students' Residential Hall (Online Services-MSRH) at University Utara Malaysia (UUM) and developing the prototype.

4.1 Proposed System

The proposed system in this study is Designing and Developing an Online Services System: a Case of Maybank Students Residential Hall (Online Services MSRH).

4.2 System Requirements

4.2.1 Functional Requirements

There are two users dealing with the system: Management System (Administrator) and students. The user interacts with the system through the interfaces. As well as the requirements appear it based on the users interface.

-Management System (Administrator)

a) Administrator need to login in the first.

b) Administrator can manage all students information (this manage includes Add, Update, Delete and Search).

c) Administrator can manage announcements (this manage includes Add and Delete).

d) Administrator can manage response to students request (this manage includes view students request and response to the request).

e) Administrator can change password.

-Students

a) Students need to login in the first.

b) Students can send his/her request.

c) Students can view response to his/her request.

d) Students can view announcement.

e) Students can change password.

4.2.2 Non Functional Requirements

-Security

- This will be guaranteed by assigning different privileges to different users.

-**Reliability**

- Availability of the system.
- Rate of failure occurrence very low.

-**Speed**

- The system will increase the speed of all daily activities.

- **Navigation**

- The system offering the opportunity to go to other parts of the application.

-Help & Support

- Support workflow in the system and support the user to fulfill their missions.

-Error handling

- Errors are avoided as much as possible.

4.2.3 Hardware Requirements

The system needs high quality hardware in (CPU, RAMS, Hard Disk, etc...) to execute it.

4.2.4 Software Requirements

- Operating System

- Microsoft Windows XP Professional.

- Database

- This component uses to store the information; the prototype uses Microsoft Access Database (MADB).

- Microsoft Visual Studio 2005

- This component is essential to run the ASP.NET 2.0 web sites.

-Microsoft .Net Framework SDK v 2.0

- Microsoft visual studio required this framework.

4.3 System Design

The temporary design follows the proposal. The design of the system includes UML diagrams “The UML is the standard language for specifying, visualizing, constructing, and documenting all the artifacts of a software system” (Quatrani, 2001). The UML diagrams involved use case diagram, sequence diagrams and class diagram. The following section illustrates the design of the prototype. To draw the diagrams we used Rational Rose 2000 Enterprise Edition that helped us in the development stage.

4.3.1 Use Case Diagram

A vital part of the Unified Modeling Language (UML) is an object to draw the use case diagrams. Use cases are used in the analysis phase of a project to identify and partition system functionality. They separate the system into actors and use cases. Actors may be people, other computers, or other software systems. Use cases describe the behavior of the system, when one of these actors sends a specific stimulus (Engineering Notebook, 1998).

There are two actors (Staff and Students) in this study. The staff represents the administrator of the system. As well as the system has many use cases. It represented in the following Figure 4.1:

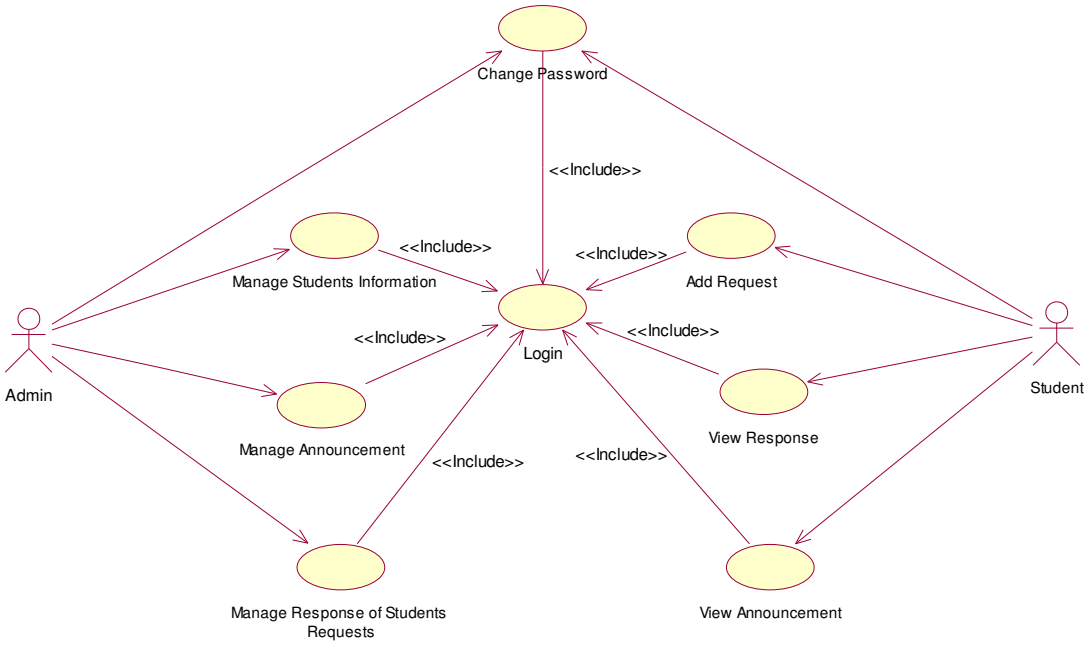


Figure 4.1: Online Services System: Maybank Students' Residential Hall Use Case

4.3.2 Use Case Specification

The details of use case specification attached in appendix B. You can return to the appendix to see it.

4.3.3 Sequence Diagram

The sequence diagram shows how objects interact with each other (Cho , Kim, Cha and Bae, 2000).

A sequence diagram shows the details of interactions that occur on time between the objects associated with each use case. Interact by sending objects messages to each other. The sequence diagram for each Use Case as illustrates in the flowing:

Login

Figure 4.2 illustrates the login sequence diagram for the administrator and the students. When Admin or Student need to login to the system they are use different user name and password.

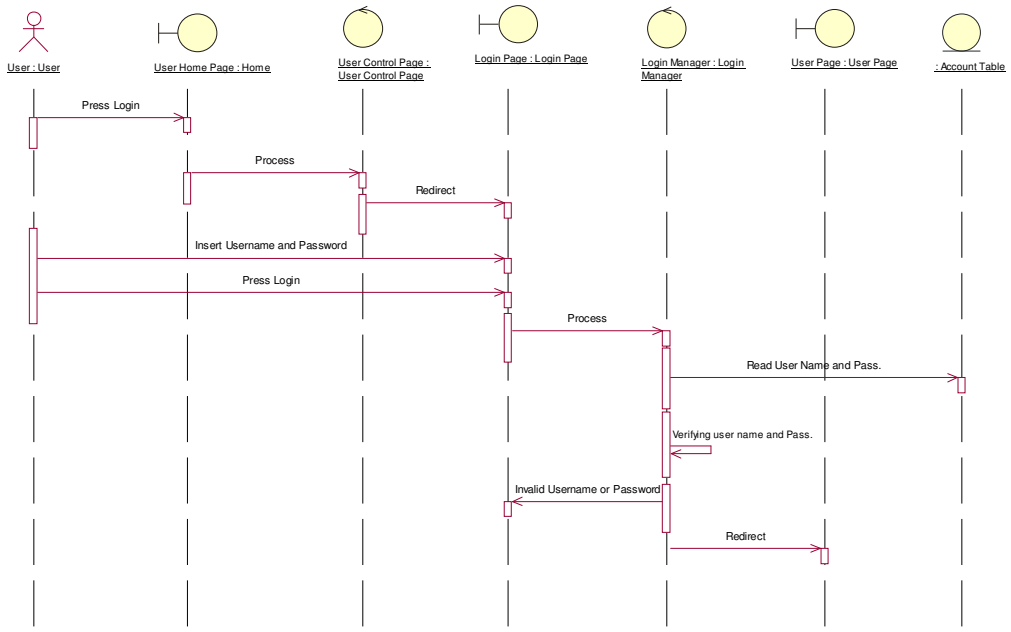


Figure 4.2: Admin and Student Login Sequence Diagram

Change Password

Figure 4.3 illustrates the change password sequence diagram for administrator and students. Admin or Student can change their password by using this function. They are use different page.

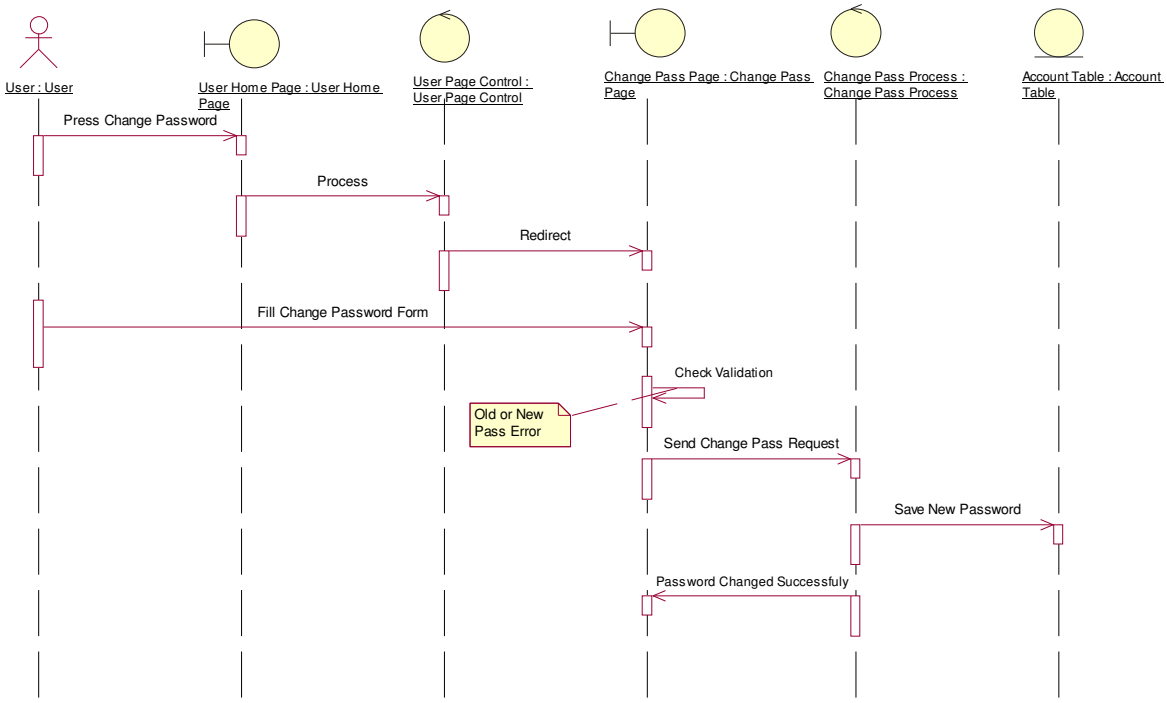


Figure 4.3: Admin and Student Change Password Sequence Diagram

Admin Add Information of New Students

Figure 4.4 illustrates add new student sequence diagram. This function allows to admin adding the students' information.

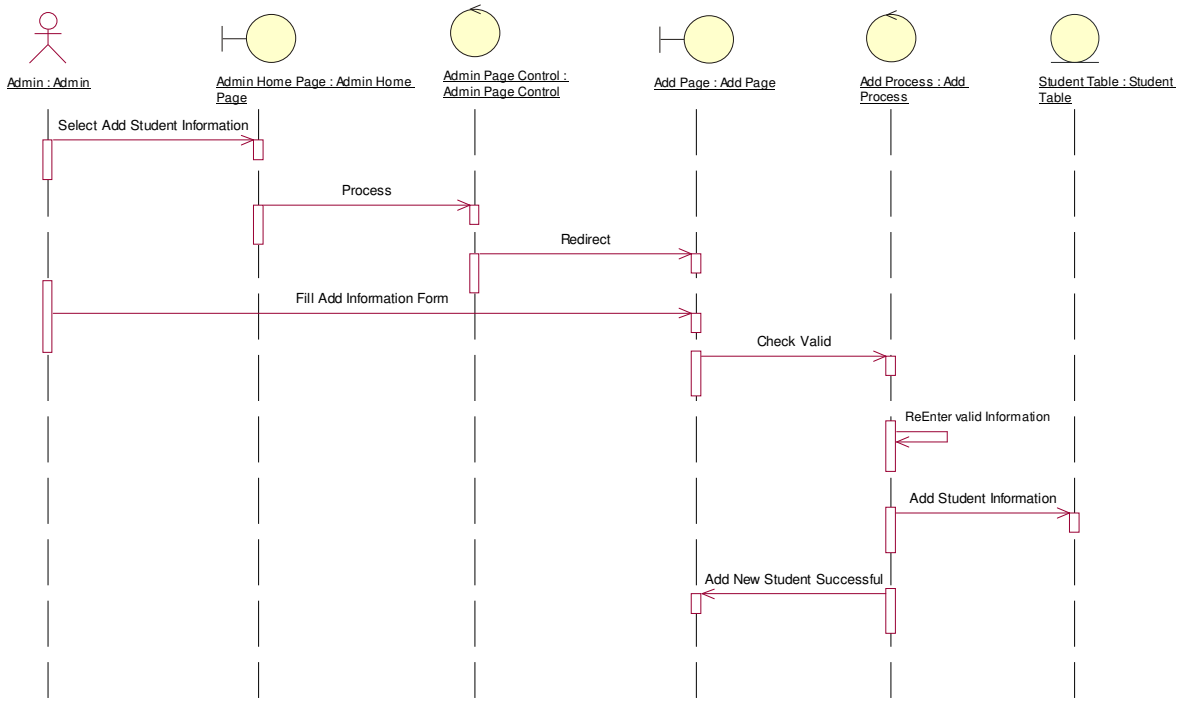


Figure 4.4: Admin Add New Student Information Sequence Diagram

Admin Update Students Information

Figure 4.5 illustrates update student information sequence diagram. This function allows to admin updating the students' information.

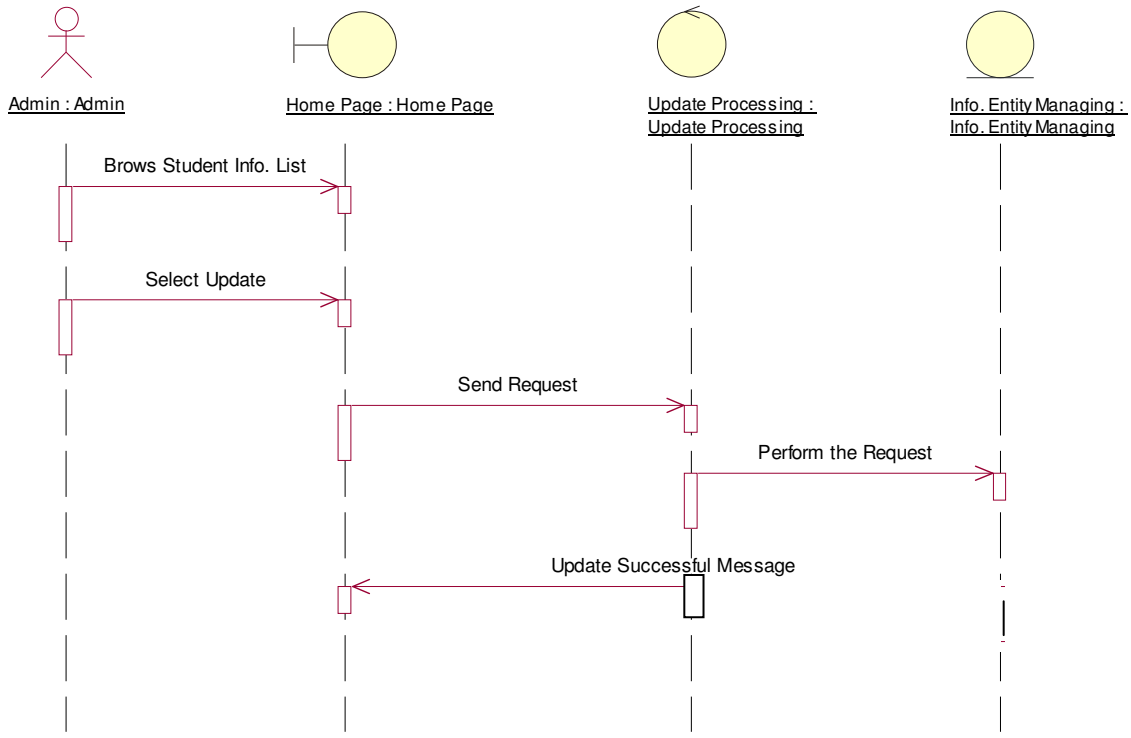


Figure 4.5: Admin Update Student Information Sequence Diagram

Admin Delete Students Information

Figure 4.6 illustrates delete student information sequence diagram. This function allows to admin deleting the students' information.

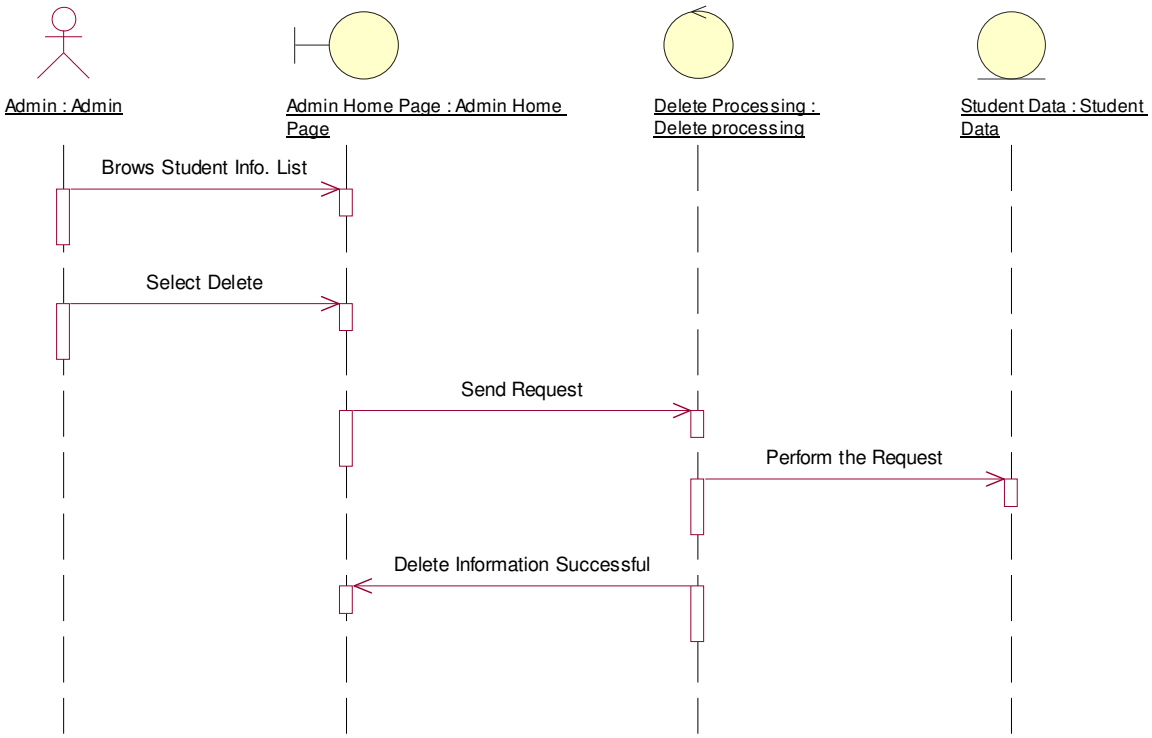


Figure 4.6: Admin Delete Student Information Sequence Diagram

Admin Search Students Information

Figure 4.7 illustrates the searching of the students' information sequence diagram. This function allows to admin searching about the students' information.

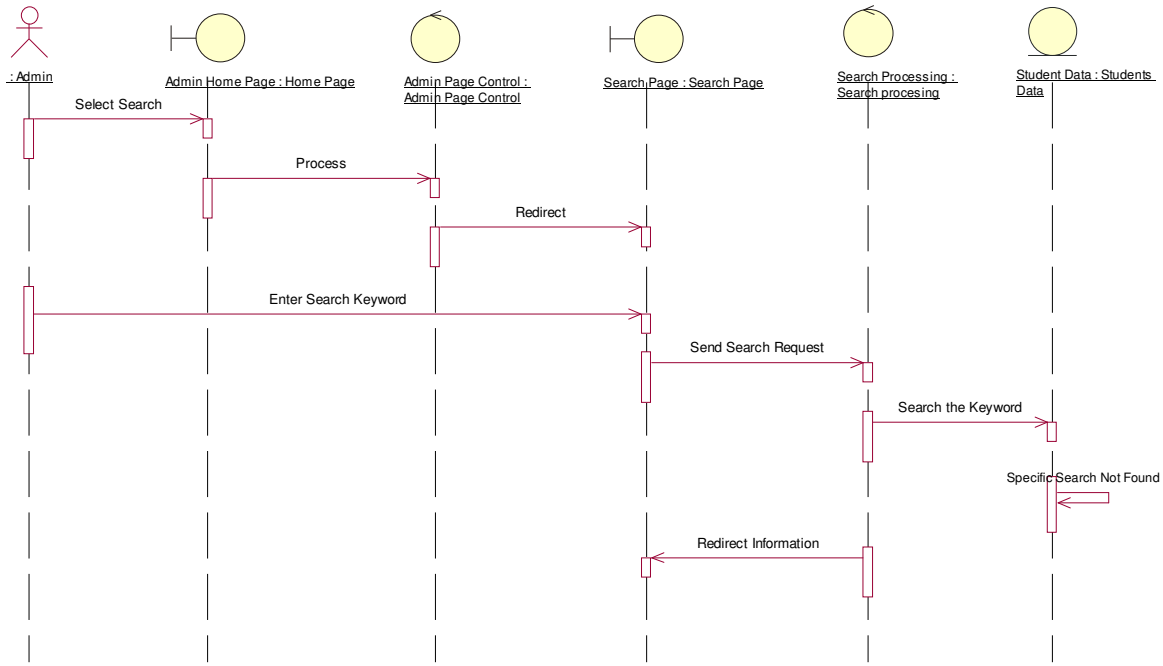


Figure 4.7: Admin Search Student Information Sequence Diagram

Admin Send New Announcement

Figure 4.8 illustrates the sending of new announcement sequence diagram. This function allows to admin sending new announcement.

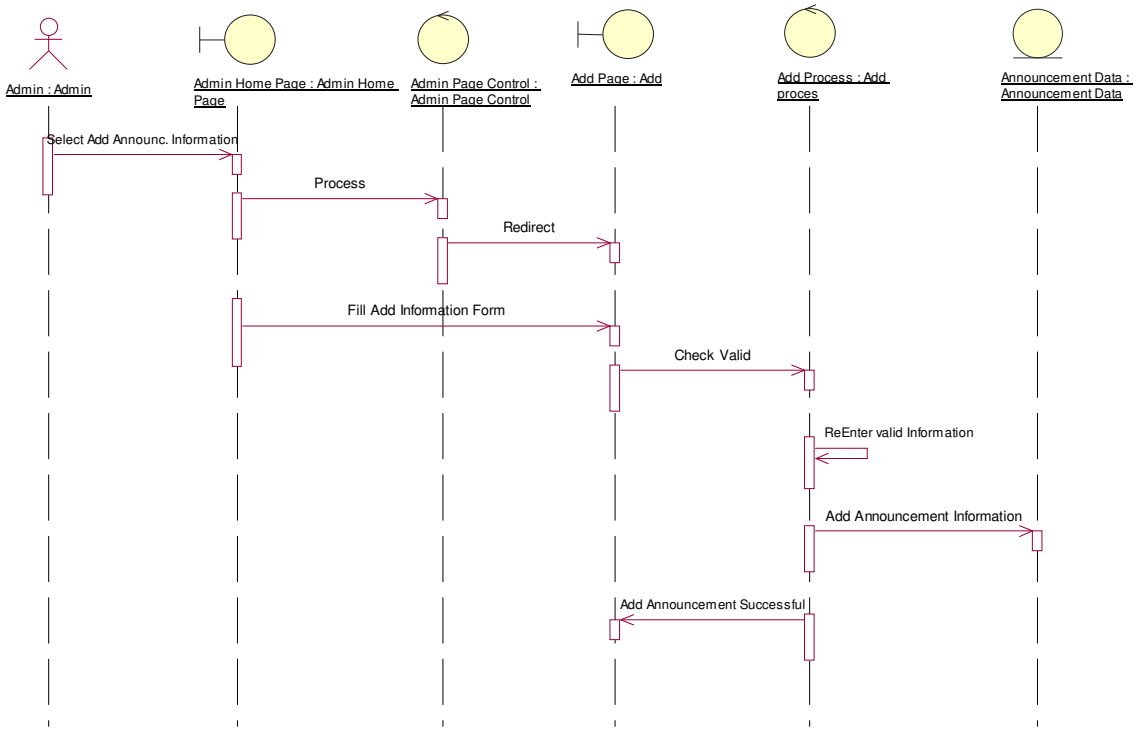


Figure 4.8: Admin Send New Announcement Sequence Diagram

Admin Delete Announcement

Figure 4.9 illustrates the deleting of announcement sequence diagram. This function allows to the admin deleting old announcement.

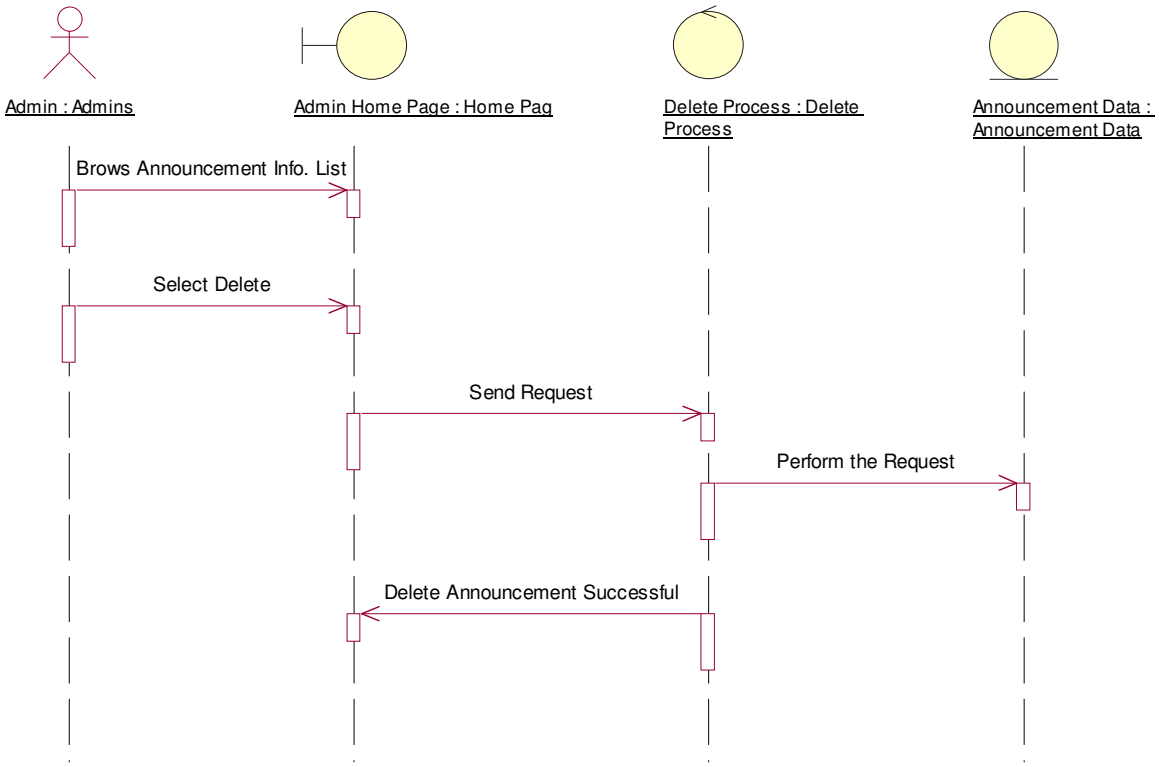


Figure 4.9: Admin Delete Announcement Sequence Diagram

Admin Manage Response to Students Request

Figure 4.10 illustrates the viewing and the responding sequence diagram. This function allows to admin viewing and sends responding to student.

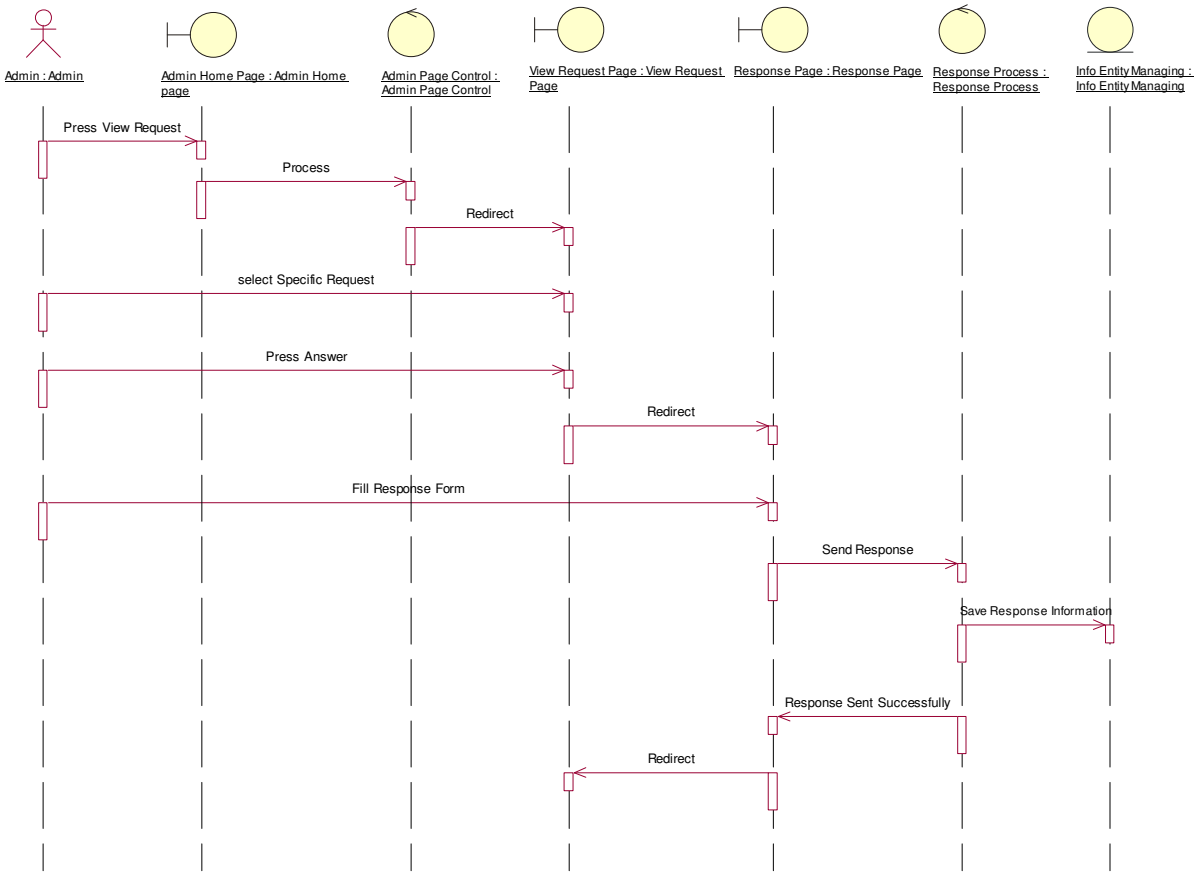


Figure 4.10: Admin Manage Response to Students Request Sequence Diagram

Student Send Request

Figure 4.11 illustrates send request sequence diagram of the students' request. This function allows to student to send his/her request.

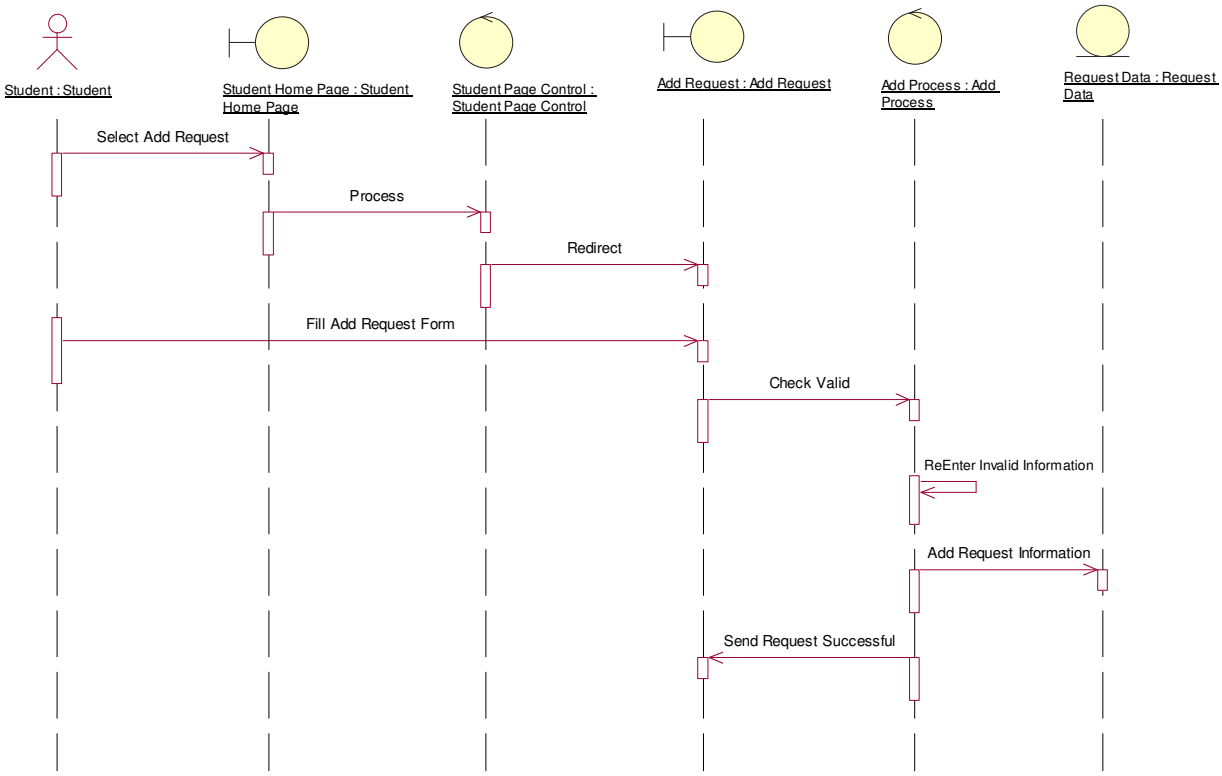


Figure 4.11: Student Send Request Sequence Diagram

Student View Admin Response

Figure 4.12 illustrates student view admin response sequence diagram for student. This function allows to student to view the details of admin response to students request.

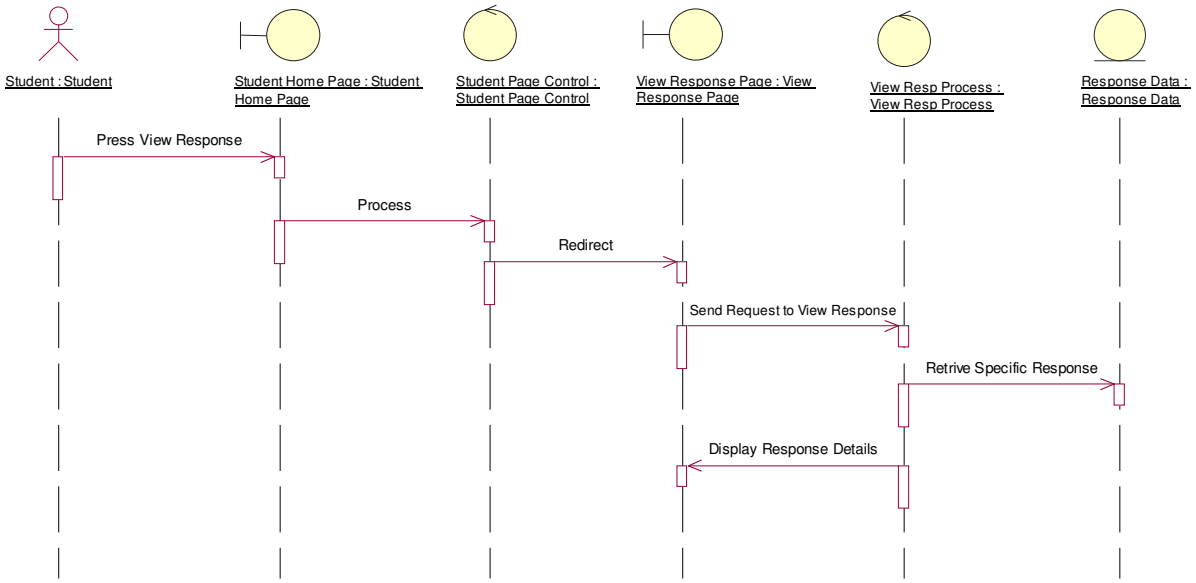


Figure 4.12: Student View Admin Response Sequence Diagram

Student View Announcement

Figure 4.13 illustrates student view announcement sequence diagram for student. This function allows to student to view all announcement send from the office of Maybank College.

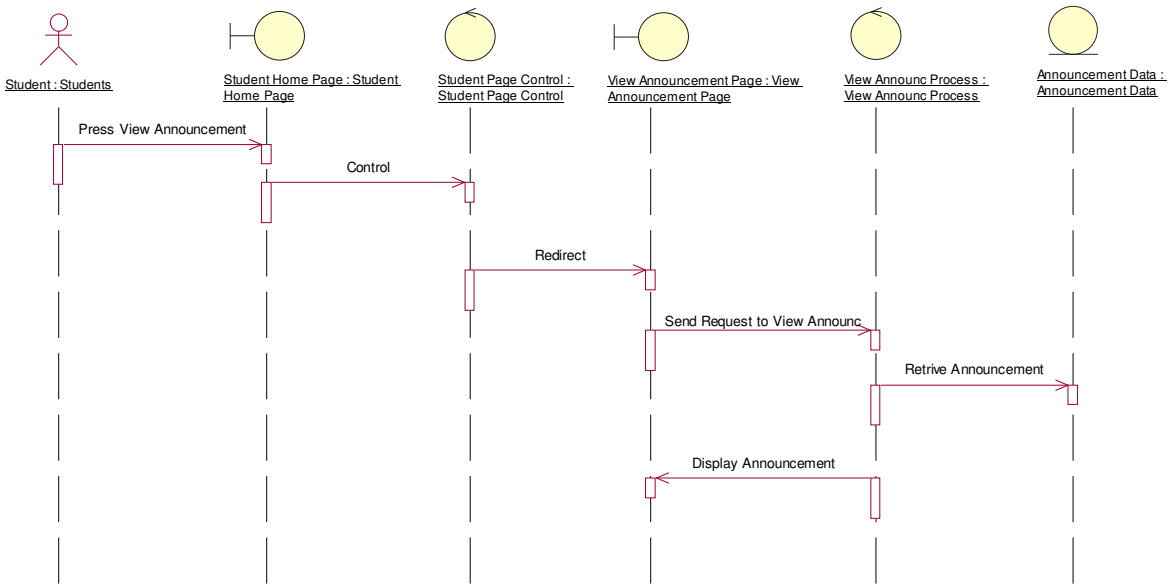


Figure 4.13: Student View Announcement Sequence Diagram

4.3.4 Class Diagram

The purpose of a class diagram is to illustrate the classes within a model. In an object oriented application, classes have attributes (member variables), operations (member functions) and relation- ships with other classes. The UML class diagram can illustrate all these things fairly easily (Martin, 2003).

Figure 4.14: Class Diagram for Online Services System of MSRH

As shown in figure 4.14, the class diagram of the system consists of two classes which are (Administrator and Students). The Administrator class contains the information about the manager of the system and all operations he/she can do it. The Students class contains all of the information for the students and all operations their can do it.

4.3.5 Database Design

This study uses Microsoft Access Database (2003) because there are many features in it, which includes in the following (Chong and Mulhern, 2004):

- Access users can create tables, queries, forms, reports, pages and modules.
- Tables are grids that store related information.
- Queries ask questions of the database to help locate specific information.
- Pages "separate files outside the Access database in HTML format that can be placed on the Web to facilitate data sharing with the world-wide Internet community."
- Another software feature of Access is its support of a variety of data formats.
- It is also possible to post information such as forms and reports on the Web, so that people in remote locations may view the required information.

The database of the system (online Services-MSRH) consists of five tables, these tables are:

Admin_Log Table

Table 4.1 illustrates Admin_Log table. This table contains admin user name and admin password.

Table 4.1: Admin_Log Table

Field Name	Data Type
Admin_User (PK)	Text
Admin_Pass	Text

Students Table

Table 4.2 illustrates Students table. This table contains the students' information.

Table 4.2: Students Table

Field Name	Data Type
Matric (PK)	Text
Name	Text
Block	Text
Room_No	Number
Password	Text

Students Request Table

Table 4.3 illustrates students request table. This table contains the details of the students' request.

Table 4.3: Student Request Table

Field Name	Data Type
Stu_Matric	Text
Date	Date/Time
Chair	Number
Study Table	Number
Bed	Number
Sofa	Number
Main_Sewer	Text

Main_Electric	Text
Main_Furnitutre	Text
Others	Text
State	Text

Admin Response Table

Table 4.4 illustrates admin response table. This table contains the details of the admin response to the students' request.

Table 4.4: Admin Response Table

Field Name	Data Type
Status	Text
Comment	Text
Date	Date/Time
Matric	Text

Announcement Table

Table 4.5 illustrates announcement table. This table contains the details of the announcement.

Table 4.5: Announcement Table

Field Name	Data Type
Date	Date/Time
Title	Text
Subject	Memo

4.4 System Development

4.4.1 Introduction

This study uses ASP.Net (Microsoft Visual Studio 2005) to develop the prototype "Online Services System: a Case of Maybank Students' Residential Hall". ASP.Net called a server side programming language. "Server-side programming is programming that is done where the code is executed on a server" (McMahon, 2005). In these programming languages the code is executed when a request is received from a client, and it creates code that Web browsers understand (HTML) and sends it back to the client, as illustrated in Figure 4.15

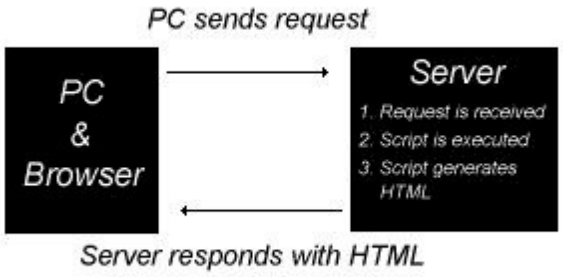


Figure 4.15: Server-Side Programming Model (McMahon, 2005)

Also the research uses Usability Guideline (UG) to develop the system. We explain it in section 4.4.3

4.4.2 System Architecture

Users can access to online services system of Maybank Students' Residential Hall by using the website to do their demands. For example, the students can view the

announcements of Maybank office and send their requests directly by using this website. The prototype development environment as illustrated in Table 4.6:

Table 4.6: Prototype Development Environment

Prototype Development Environment	
Programming Language	ASP.Net (Microsoft Visual Studio 2005)
Database	Microsoft Access Database
Operating System	Windows XP
Computer Browser	Internet Explorer 7

The users can access to database by using the website pages. The users can send and receive from database by the server, this operations illustrated in Figure 4.16

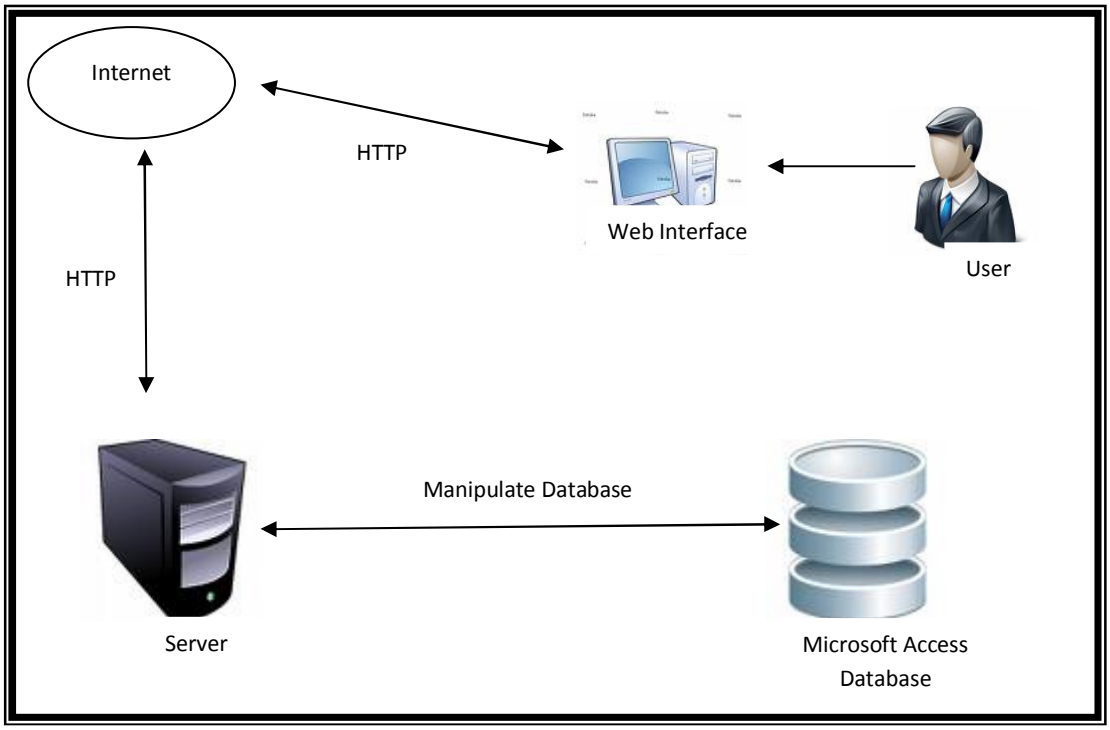


Figure 4.16: Online Services System for Maybank Students' Residential Hall Architecture

4.4.3 Using Usability Guideline (UG) in System Development

This study uses the requirements of Usability Guideline (UG) to develop the system. This usability guidelines that are specific to online interfaces (Department of Industry, Tourism and Resources and The Hiser Group Pty Ltd, 2006). Main points in this guideline have been explained in previous chapter. This section refers to use this usability guideline in prototype development.

A) Make it easy for users to find the forms: The user can access to any form from the short cuts menu in home page. Also each page in the system provides users by menus as short cuts to any form. For example when the students want to send requests can use this menu from any page.

B) Create a good first impression: The system does not use embedded fonts in PDF files; because these fonts are enlarging the size of the file. Also all forms are clearing to user if he/she wants to use it. These forms do not contain huge information and it do not contain scroll bar.

C) Encourage user trust: The spelling and grammar have been reviewed in the system (Online Services-MSRH). Also the links throughout the form have been reviewed to rectify any broken links. The user can print any page by press one click in the picture of printer in each page.

D) Create a flexible design which will support the needs of deferent users: The system provides picture of printer as link in all pages to allow to the users to print the forms.

E) In designing forms has been avoided using 'Submit' inside the system as some users feel this language is this too technical, unfriendly or authoritative.

F) Provide users with a quick, efficient workflow: The system uses screen controls such as Drop-downs control and Check boxes control it is easier to the users to enter the data.

G) Style of language: All texts and labeling used throughout the system is as brief as possible without losing clarity of meaning. The forms of the system used 'send' instead of 'submit', and used 'required fields' instead of 'mandatory fields'. The messages in the system used positive language.

H) Each pages contained related data.

I) The system uses screen controls in the designing of forms. For example in the field of "Block Name" in "add students' information form" the system uses drop down list to choose the name of block. Also the system uses check box to allow to the students to select multiple options of maintenance in the form of send student request.

J) The system used red bold text for error messages. For example when the user enters invalid username or password, the system appears red bold message to inform the user about the error. Figure 4.17 illustrate this message:

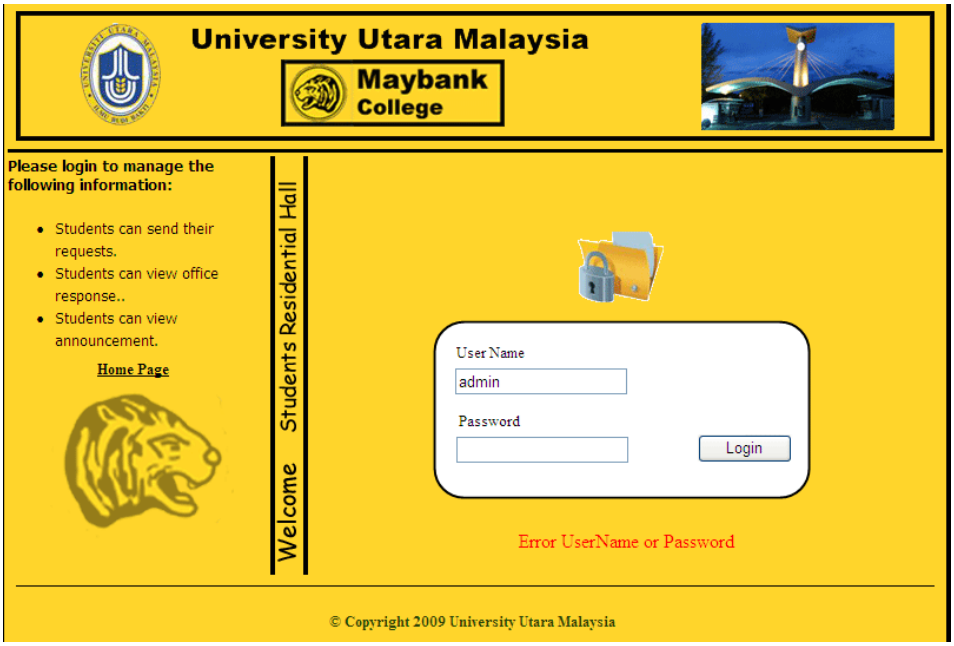


Figure 4.17: Red Bold Text for Error Message

K) All forms uses the data entry fields are high and wide enough to allow to the users to see the entered information.

L) Readability: The pages of the system use legible texts. Also it avoids using blocks or rows of text that is all capitals or all italics because users find this more difficult and slow to read.

M) Accessibility: All users can access and complete the form.

N) Appropriate use of colour: Maybank has a specific tow colours (black and yellow) so the system uses these tow colours in all pages.

O) Error Handling: The designer indicates to the users if any fields are mandatory; for example in add new student form all fields are mandatory if admin forget any field the system informs admin about the error. Figure 4.18 illustrate this case:

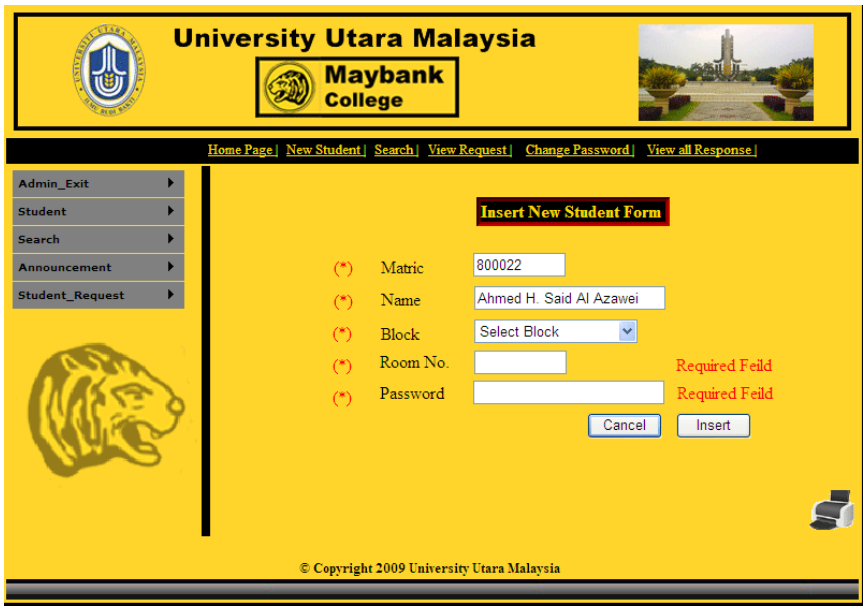


Figure 4.18: Inform User about Mandatory Fields

P) The system displays the dialog box after choosing the cancel from the form without saving the information. That can be done to confirm the action or allowing the user to return back to the application form. Figure 4.19 illustrate that:

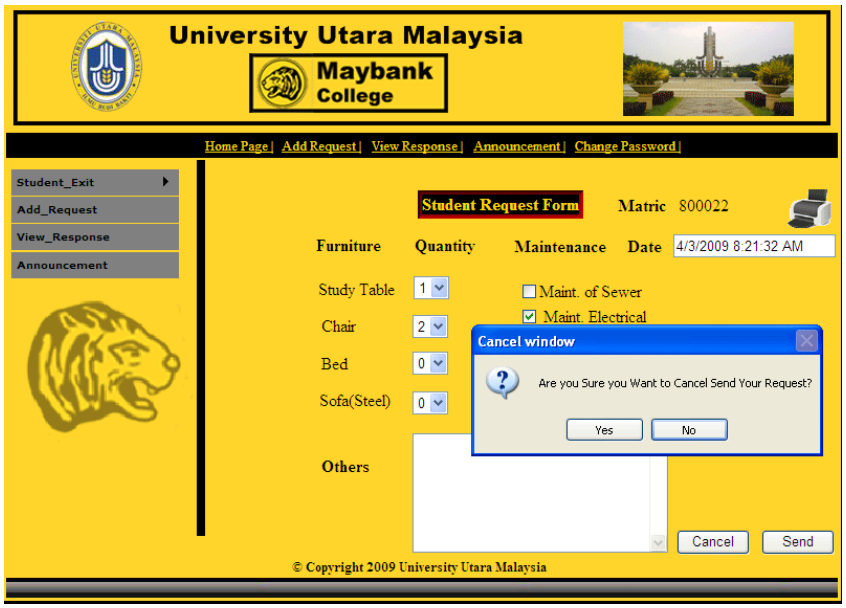


Figure 4.19: Dialog Box to Confirm User Action

Q) Also if the users entered error data the system displays dialog box to tell the users about errors. For example, when the admin enters letters in room number field in add new student form the system informs he/she about the error.

4.4.4 Graphical User Interface

This system has many pages according to the requirements has been discussed in chapter three. User manual in appendix C and more pages details about the system (Online Services System: a Case of Maybank Students' Residential Hall).

Administrator Pages

- Home Page
- Login Page
- Admin Page
- Add New Students Page
- Update Students Information Page
- View Students Information Page
- Search Students Information Page
  - Search by Matric Page
  - Search by Block Page
  - Search by Room No Page
  - Search by Block and Room No Page

- Send New Announcement Page
- Delete Announcement Page
- View Students Request Page
- View all Requests Page
- Change Password Page

Student Pages

- Home Page
- Login Page
- Send Request Page
- View Response Page
- View Announcement Page
- Change Password Page

A) Home Page

From this page the admin and the students can press on login link to go to login page, as illustrate in Figure 4.20:

Figure 4.20: Home Page

B) User Login Page

In this page the user inserts the username and password. Then press Login bottun, as illustrate in Figure 4.21:

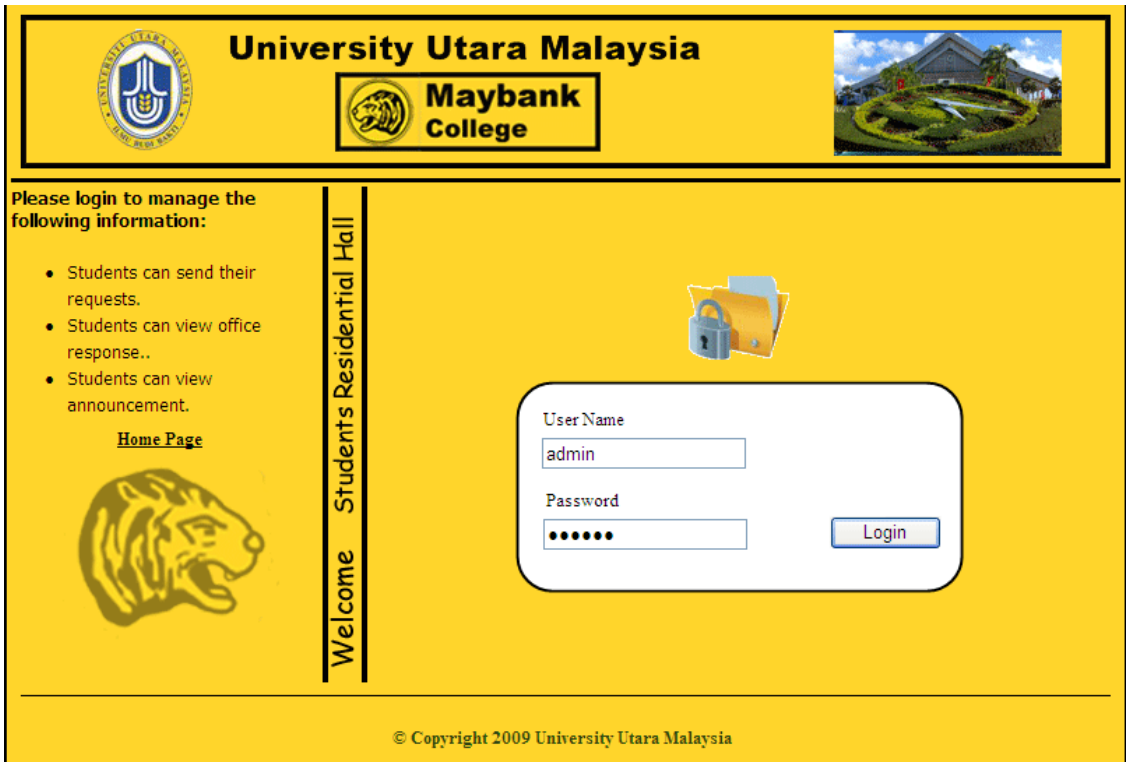


Figure 4.21:User Login Page

C) Admin Home Page

From this page the admin can administrate the functionalities. Such as add student information or send new announcement, etc...

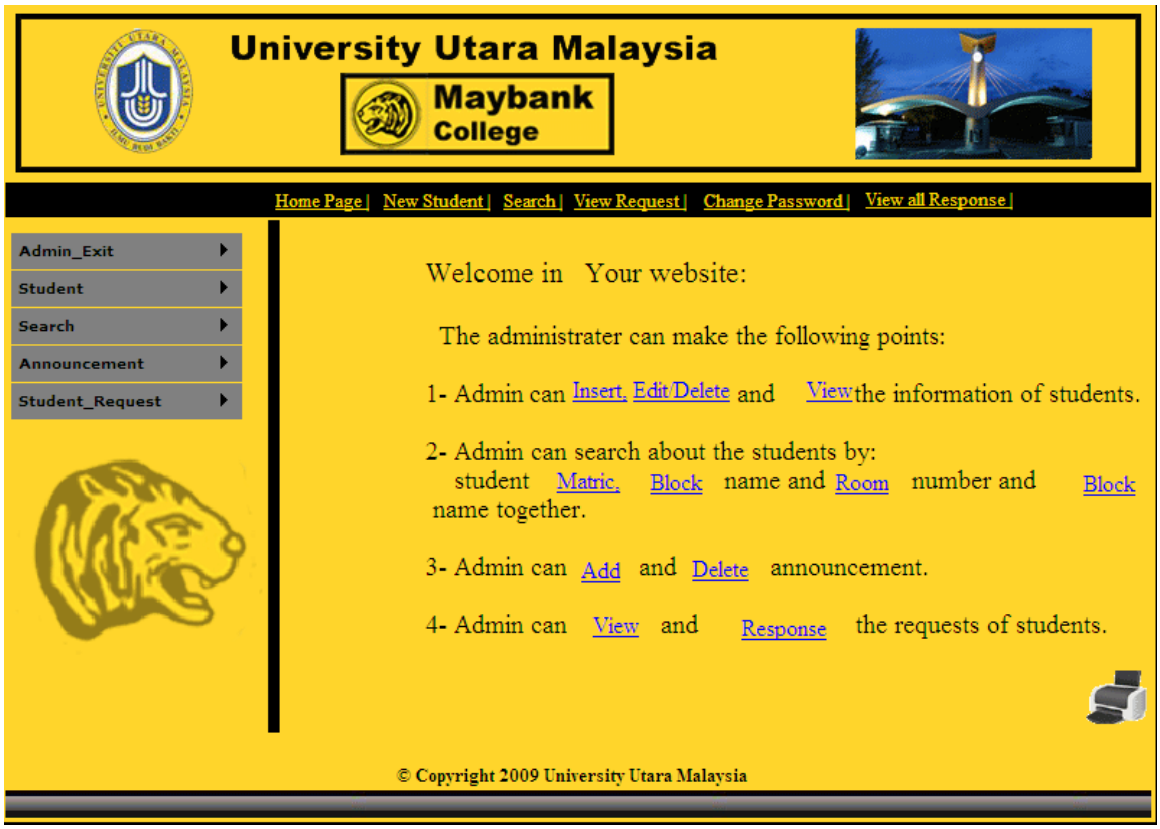


Figure 4.22:Admin Home Page

D) Add New Students Information Page

In this Page the admin can add new students information.

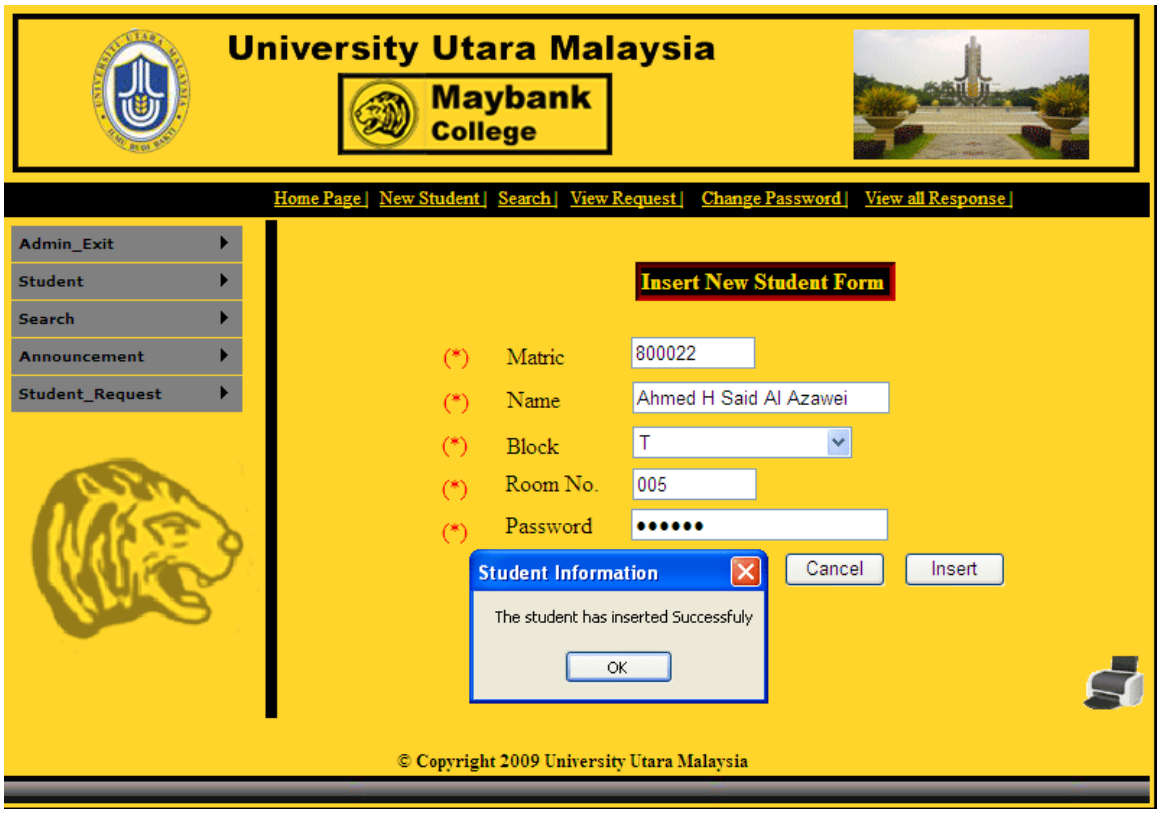


Figure 4.23: Add New Students Information Page

E) Student Home Page

From this page the student can achive their demands. Such as send the request or view announcement, etc...

Figure 4.24:Student Home Page

F) Student Add Request Page

In this page the student can send the request to the office of Maybank College.

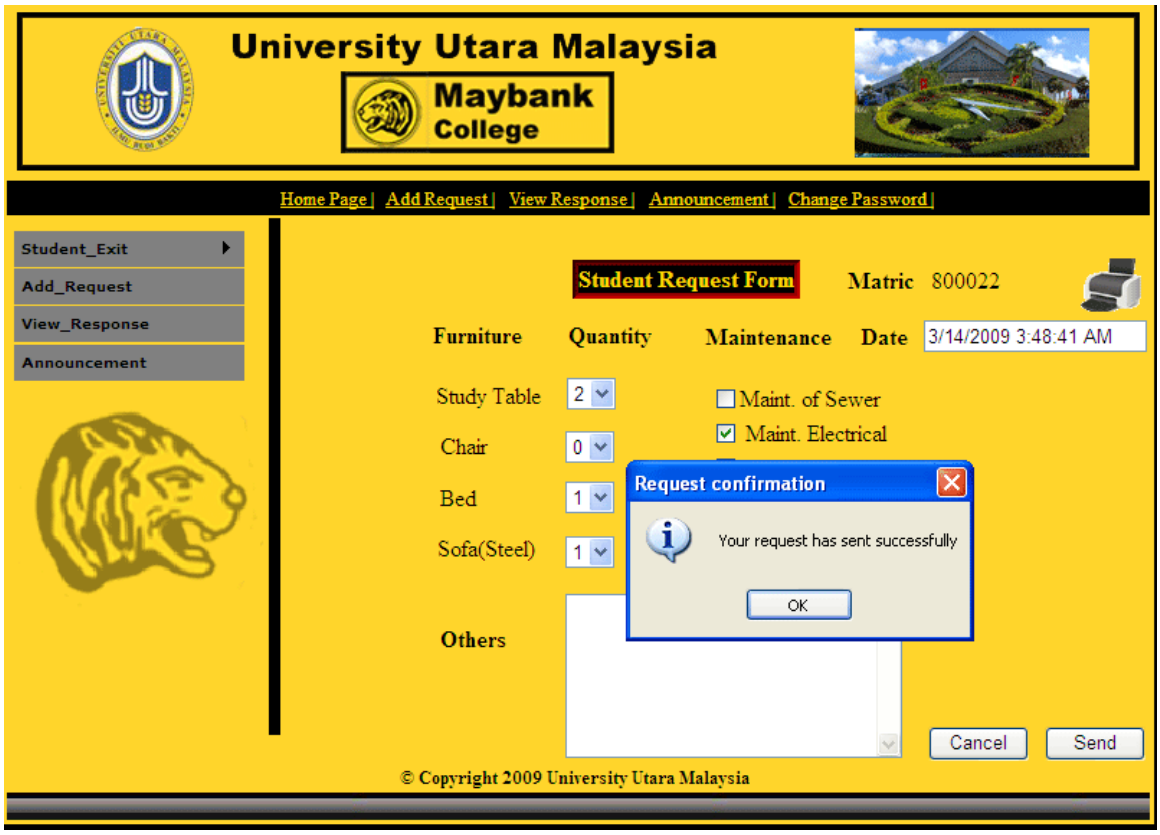


Figure 4.25: Student Add Request Page

4.5 Summary

This chapter highlights the stages in system development. The chapter divides into several sections. These sections talked about the requirements of the system, the analysis stage and the system architecture. After that the chapter focuses on the system development by using ASP.Net language and the requirements of usability guideline. In the end of this chapter the user interfaces of the system appeared.

CHAPTER FIVE

RESULTS DISCUSSION

5.0 Introduction

This chapter aims to discuss the evaluation of the Online Services System-MSRH developed prototype. The usability test dependent on Usability Guideline of Department of Industry, Tourism and Resources and The Hiser Group Pty Ltd. This usability has been attended to online applications.

The Evaluation Questionnaire was designed according to the Likert Scale. According to Uebersax (2006) Likert scales were first developed by Rensis Likert, a sociologist at the University of Michigan from 1946 to 1970. Likert relates to the measurement of psychological attitudes and hopes to do so in a "scientific" way. This Questionnaire divided to six parts, each part contains many questions. Also the interview is used with the principal of Maybank College in order to gain more insight into the staff actions with the system (The questions and the answers through the interview and the recommendation of the principal of Maybank Residential Hall attached in appendix D).

5.1 Evaluation Techniques

The evaluation was achieved after the system has been developed to verify the level of the usability operability of the system; it is tested through a questionnaire which was distributed to the students' resident in Maybank College. The sample size was 38 students. Each respondent was given a brief description of the functionality of system. Afterwards, they were allowed to use and explore the system, finally were given a set of prepared questionnaire to obtain their perceptions. The aim was to see the level of the prototype usability.

5.2 Evaluation Questionnaire

The questionnaires questions which are used in this study have been changed to be adopted depend on Usability Guideline of Department of Industry, Tourism and Resources and the Hiser Group Pty Ltd. It consisted of six main sections, firstly general information of respondent (Respondent Profile). The second section included questions about the user experience. The third section included questions about moving around the form (navigation, workflow & orientation). The fourth section included questions about reading the Site (Written Content). The fifth section included questions about viewing the site (Layout & Presentation). Finally, section six included questions about the interaction design; the questions were close ended and scaled from "Strongly Disagree" to "Strongly Agree" (a form of the Questionnaire attached in appendix A).

5.3 Data Analysis

The data collected through the questionnaire was analyzed using SPSS software, version 11.5 is the available.

5.3.1 Respondent Profile Analysis

1) Figure 5.1 illustrates the educational background of the respondent.

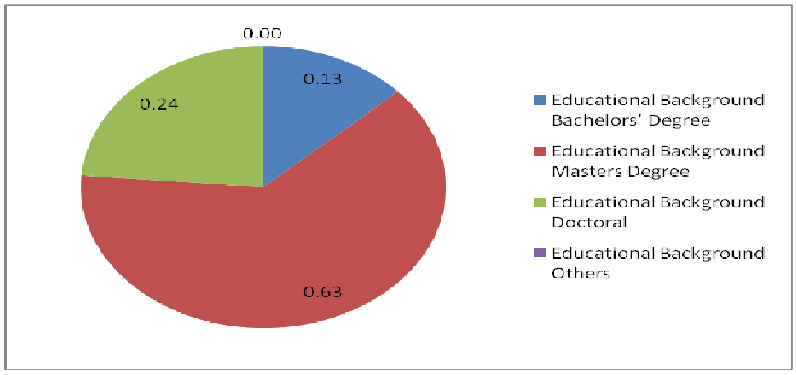


Figure 5.1: The Educational Background of the Respondents

2) Figure 5.2 illustrates the semester of the respondent.

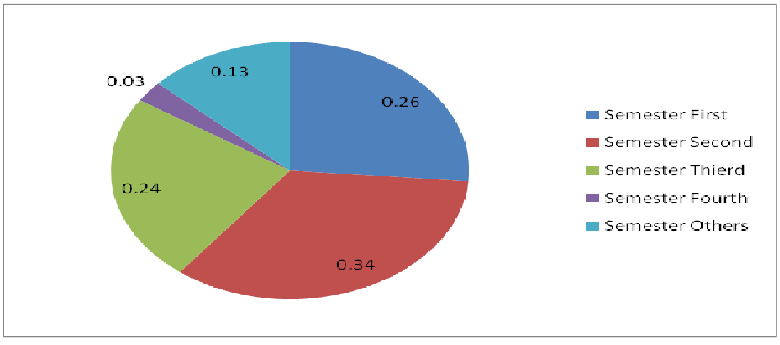


Figure 5.2: The Semester of the Respondents

3) Figure 5.3 illustrates the respondent usage to the internet. Most of the respondents are used Internet daily, this effect is positive on the system usage.

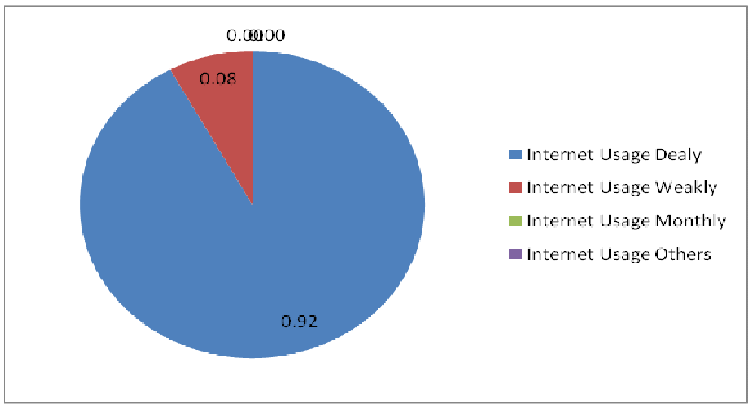


Figure 5.3: Internet Usage

4) Figure 5.4 illustrates the gender of the respondent. Most of the respondents are male.

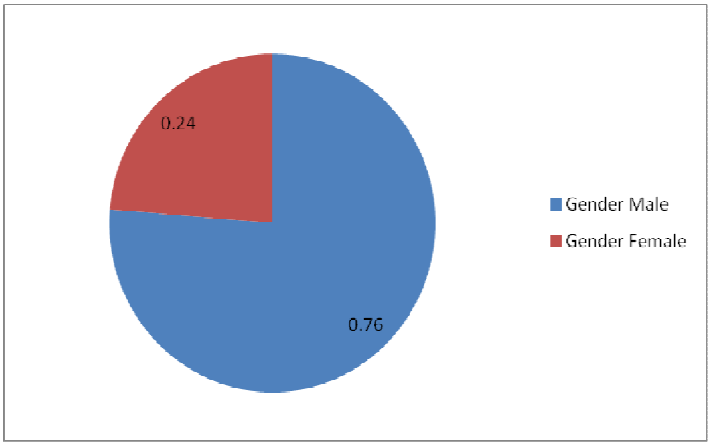


Figure 5.4: Gender of the Respondents

5) Figure 5.5 illustrates the related between the respondent and Information Technology (IT). Most of the respondents are related with IT, this effect is positive on the system evaluation.

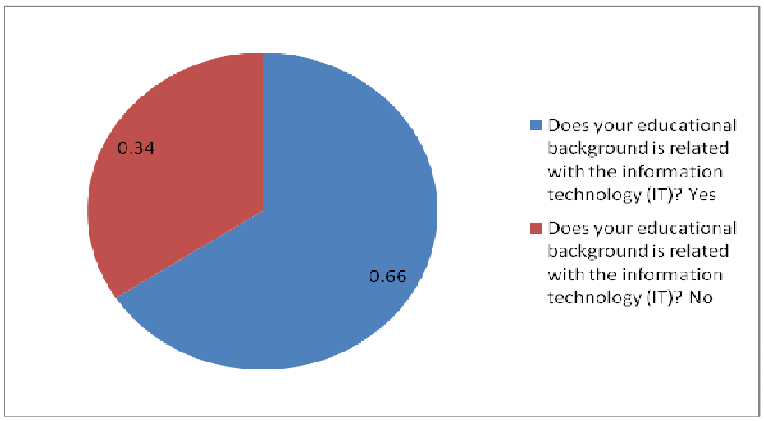


Figure 5.5: Related Between the Respondents and IT

5.3.2 Descriptive Statistics

5.3.2.1 Descriptive Statistics for Each Section

Section B: User Experience

Table 5.1 describes the number of the respondent, the minimum and maximum answer, the mean and the STD deviation for section B.

Table 5.1: Descriptive Statistics (Section B)

	N	Minimum	Maximum	Mean	Std. Deviation
Q1	38	2.00	5.00	4.1316	.84377
Q2	38	1.00	5.00	3.7105	.95600
Q3	38	3.00	5.00	4.4211	.75808
Q4	38	2.00	5.00	3.5789	.85840
Q5	38	2.00	5.00	4.1316	.81111
Q6	38	2.00	5.00	4.2368	.88330
Valid N (listwise)	38				

Since the six questions measure the Usability of User Experience, we have to divide the summation of the corresponding values in the (mean) column by its number, so we found that the mean of the all mean values which are corresponding to the Usability of User Experience questions is (4.035083) is equal almost (80.70) which indicate that the measure of User Experience is agree altitude toward which indicate that the system Usability of User Experience are high.

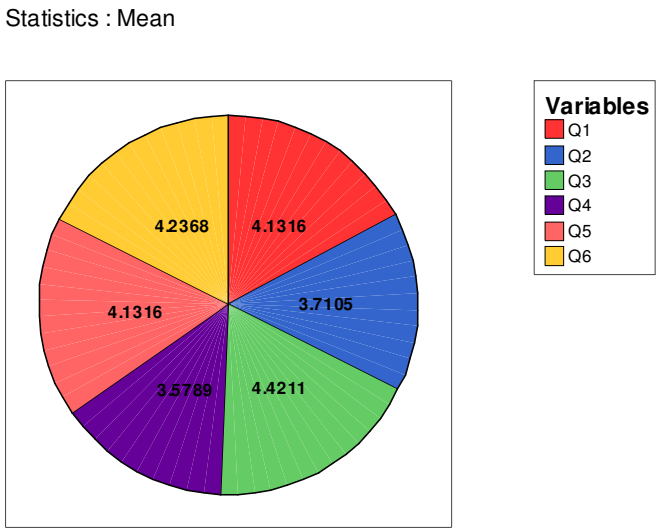


Figure 5.6: Descriptive Statistics (Section B)

Section C: Moving Around the Form (navigation, workflow & orientation)

Table 5.2 describes the number of the respondent, the minimum and maximum answer, the mean and the STD deviation for section C.

Table 5.2: Descriptive Statistics (Section C)

	N	Minimum	Maximum	Mean	Std. Deviation
Q1	38	1.00	5.00	3.6579	.87846
Q2	38	2.00	5.00	4.3158	.80891
Q3	38	2.00	5.00	4.1316	.93494
Q4	38	3.00	5.00	4.0526	.80362
Q5	38	2.00	5.00	3.9211	.85049
Q6	38	2.00	5.00	3.9211	.81809
Valid N (listwise)	38				

Since the six questions measure the Usability of Moving Around the Form, we have to divide the summation of the corresponding values in the (mean) column by its number, so we found that the mean of the all mean values which are corresponding to the Usability of Moving Around the Form questions is (4.000016667) is equal almost (80.00033) which indicate that the measure of Usability of Moving Around the Form is agree altitude toward which indicate that the system Usability of Moving Around the Form are high.

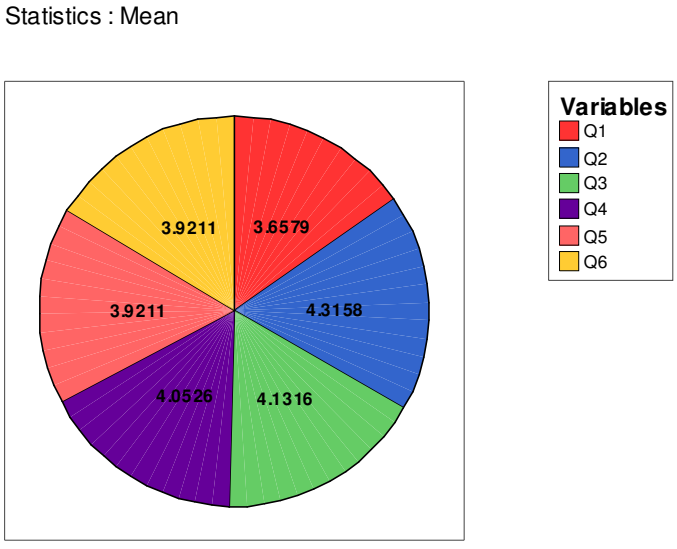


Figure 5.7: Descriptive Statistics (Section C)

Section D: Reading the Site (Written Content)

Table 5.3 describes the number of the respondent, the minimum and maximum answer, the mean and the STD deviation for section D.

Table 5.3: Descriptive Statistics (Section D)

	N	Minimum	Maximum	Mean	Std. Deviation
Q1	38	2.00	5.00	3.8684	.77707
Q2	38	2.00	5.00	3.8947	.83146
Q3	38	3.00	5.00	4.1579	.78933
Q4	38	3.00	5.00	3.7632	.75101
Q5	38	2.00	5.00	3.7895	.96304
Q6	38	2.00	5.00	4.0789	.91183
Q7	38	2.00	5.00	4.1579	.97333
Q8	38	2.00	5.00	4.1316	.87522
Q9	38	2.00	5.00	3.9474	.86828
Q10	38	2.00	5.00	4.1316	.81111
Valid N (listwise)	38				

Since the ten questions measure the Usability of Reading the Site, we have to divide the summation of the corresponding values in the (mean) column by its number, so we found that the mean of the all mean values which are corresponding to the Usability of Reading the Site questions is (3.99211) is equal almost (79.8422) which indicate that the measure of Usability of Reading the Site is agree altitude toward which indicate that the system Usability of Reading the Site are high.

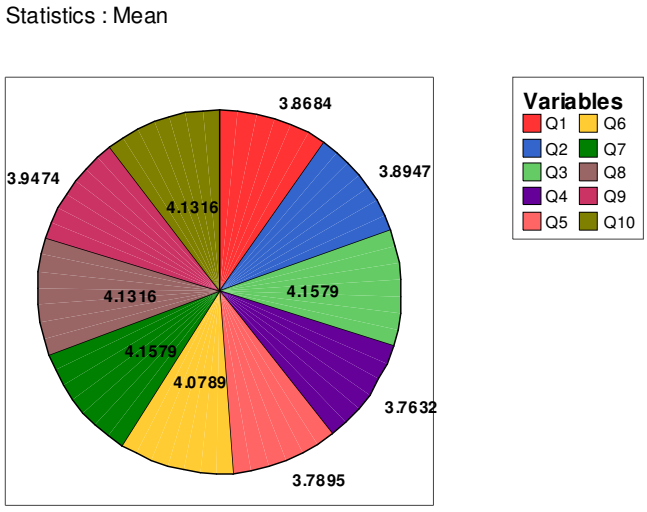


Figure 5.8: Descriptive Statistics (Section D)

Section E: Viewing the Site (Layout & Presentation)

Table 5.4 describes the number of the respondent, the minimum and maximum answer, the mean and the STD deviation for section E.

Table 5.4: Descriptive Statistics (Section E)

	N	Minimum	Maximum	Mean	Std. Deviation
Q1	38	2.00	5.00	3.5789	.82631
Q2	38	3.00	5.00	4.0000	.83827
Q3	38	1.00	5.00	3.6842	.90360
Q4	38	2.00	5.00	3.8158	.92577
Q5	38	3.00	5.00	4.0000	.77110
Q6	38	3.00	5.00	3.8947	.72743
Q7	38	2.00	5.00	4.1316	.87522
Q8	38	2.00	5.00	4.0526	.86828
Q9	38	2.00	5.00	4.0263	.91495
Q10	38	2.00	5.00	3.9474	1.01202
Valid N (listwise)	38				

Since the ten questions measure the Usability of Viewing the Site, we have to divide the summation of the corresponding values in the (mean) column by its number, so we

found that the mean of the all mean values which are corresponding to the Usability of Viewing the Site questions is (3.91315) is equal almost (78.263) which indicate that the measure of Usability of Viewing the Site is agree altitude toward which indicate that the system Usability of Viewing the Site are high.

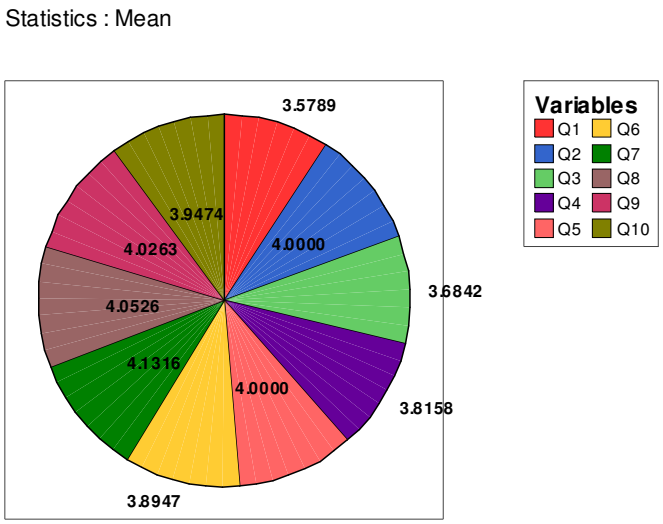


Figure 5.9: Descriptive Statistics (Section E)

Section F: Interaction Design

Table 5.5 describes the number of the respondent, the minimum and maximum answer, the mean and the STD deviation for section F.

Table 5.5: Descriptive Statistics (Section F)

	N	Minimum	Maximum	Mean	Std. Deviation
Q1	38	2.00	5.00	3.9474	.95712
Q2	38	3.00	5.00	4.2105	.77661
Q3	38	3.00	5.00	3.8684	.70408
Q4	38	2.00	5.00	4.1316	.90557
Q5	38	2.00	5.00	3.9474	.92845
Valid N (listwise)	38				

Since the five questions measure the Usability of Interaction Design, we have to divide the summation of the corresponding values in the (mean) column by its number, so we found that the mean of the all mean values which are corresponding to the Usability of Interaction Design questions is (4.02106) is equal almost (80.42) which indicate that the measure of Usability of Interaction Design is agree altitude toward which indicate that the system Usability of Interaction Design are high.

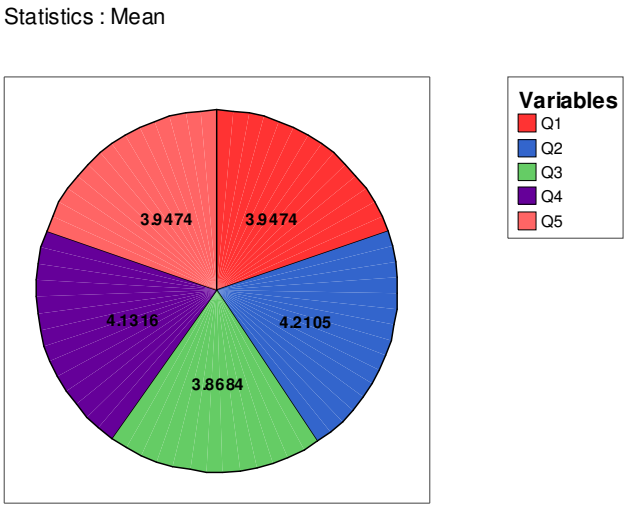


Figure 5.10: Descriptive Statistics (Section F)

5.3.2.2 Descriptive Statistics for All Sections

Table 5.6 describes the number of the respondent, the range, the minimum and maximum answer, the mean and the STD deviation for all sections.

Table 5.6: Descriptive Statistics for All Sections

	N	Range	Minimum	Maximum	Mean	Std. Deviation
X1	38	3.00	2.00	5.00	4.1316	.84377
X2	38	4.00	1.00	5.00	3.7105	.95600
X3	38	2.00	3.00	5.00	4.4211	.75808

X4	38	3.00	2.00	5.00	3.5789	.85840
X5	38	3.00	2.00	5.00	4.1316	.81111
X6	38	3.00	2.00	5.00	4.2368	.88330
X7	38	4.00	1.00	5.00	3.6579	.87846
X8	38	3.00	2.00	5.00	4.3158	.80891
X9	38	3.00	2.00	5.00	4.1316	.93494
X10	38	2.00	3.00	5.00	4.0526	.80362
X11	38	3.00	2.00	5.00	3.9211	.85049
X12	38	3.00	2.00	5.00	3.9211	.81809
X13	38	3.00	2.00	5.00	3.8684	.77707
X14	38	3.00	2.00	5.00	3.8947	.83146
X15	38	2.00	3.00	5.00	4.1579	.78933
X16	38	2.00	3.00	5.00	3.7632	.75101
X17	38	3.00	2.00	5.00	3.7895	.96304
X18	38	3.00	2.00	5.00	4.0789	.91183
X19	38	3.00	2.00	5.00	4.1579	.97333
X20	38	3.00	2.00	5.00	4.1316	.87522
X21	38	3.00	2.00	5.00	3.9474	.86828
X22	38	3.00	2.00	5.00	4.1316	.81111
X23	38	3.00	2.00	5.00	3.5789	.82631
X24	38	2.00	3.00	5.00	4.0000	.83827
X25	38	4.00	1.00	5.00	3.6842	.90360
X26	38	3.00	2.00	5.00	3.8158	.92577
X27	38	2.00	3.00	5.00	4.0000	.77110
X28	38	2.00	3.00	5.00	3.8947	.72743
X29	38	3.00	2.00	5.00	4.1316	.87522
X30	38	3.00	2.00	5.00	4.0526	.86828
X31	38	3.00	2.00	5.00	4.0263	.91495
X32	38	3.00	2.00	5.00	3.9474	1.01202
X33	38	3.00	2.00	5.00	3.9474	.95712
X34	38	2.00	3.00	5.00	4.2105	.77661
X35	38	2.00	3.00	5.00	3.8684	.70408
X36	38	3.00	2.00	5.00	4.1316	.90557
X37	38	3.00	2.00	5.00	3.9474	.92845
X38	38					

5.3.3 Reliability Statistics

Cronbach's Alpha based on standardized items use to measure the reliability scale of the system usability. According to Yu (2000) in general the higher the Alpha is, the more reliable the test is. There is not a commonly arranged cut-off; but, 0.7 and higher the reliability is acceptable.

5.3.3.1 Reliability Statistics for Each Section

Section B: User Experience

Table 5.7 illustrates Cronbach's Alpha based on standardized items for section B.

Table 5.7: Reliability Statistics (Section B)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.7743	.7808	6

Section C: Moving Around the Form (Navigation, Workflow & Orientation)

Table 5.8 illustrates Cronbach's Alpha based on standardized items for section C.

Table 5.8: Reliability Statistics (Section C)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.7579	.7610	6

Section D: Reading the Site (Written Content)

Table 5.9 illustrates Cronbach's Alpha based on standardized items for section D.

Table 5.9: Reliability Statistics (Section D)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.7242	.7290	10

Section E: Viewing the Site (Layout & Presentation)

Table 5.10 illustrates Cronbach's Alpha based on standardized items for section E.

Table 5.10: Reliability Statistics (Section E)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.7293	.7320	10

Section F: Interaction Design

Table 5.11 illustrates Cronbach's Alpha based on standardized items for section E.

Table 5.11: Reliability Statistics (Section F)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.7216	.7272	5

5.3.3.2 Reliability Statistics for All Sections

The following table 5.12 illustrates Cronbach's Alpha to all questions.

Table 5.12: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.912	.914	37

5.3.4 Item-Total Statistics

According to Field (2006) one of the most important for questionnaire reliability the scale if item deleted. The questionnaire is reliable if the value of Cronbach's alpha around 0.8 or higher. Table 5.2 shows the percentage of scale mean if item deleted and the scale variance if item deleted and the corrected item total correlation and the cronbach's alpha if item deleted for the system usability questions.

Table 5.13: Item -Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
X1	143.2368	223.915	.738	.906
X2	143.6579	230.015	.425	.910
X3	142.9474	228.105	.637	.908
X4	143.7895	228.225	.552	.909
X5	143.2368	229.105	.550	.909
X6	143.1316	226.766	.591	.908

X7	143.7105	236.806	.210	.913
X8	143.0526	230.484	.494	.909
X9	143.2368	230.294	.426	.910
X10	143.3158	233.627	.366	.911
X11	143.4474	229.389	.511	.909
X12	143.4474	234.957	.305	.912
X13	143.5000	233.716	.377	.911
X14	143.4737	227.878	.585	.908
X15	143.2105	230.873	.491	.910
X16	143.6053	231.867	.474	.910
X17	143.5789	232.250	.344	.912
X18	143.2895	232.536	.356	.911
X19	143.2105	234.333	.268	.913
X20	143.2368	232.888	.360	.911
X21	143.4211	231.277	.425	.910
X22	143.2368	228.672	.568	.909
X23	143.7895	233.846	.346	.911
X24	143.3684	228.888	.539	.909
X25	143.6842	233.735	.315	.912
X26	143.5526	229.281	.468	.910
X27	143.3684	230.563	.517	.909
X28	143.4737	233.986	.393	.911
X29	143.2368	231.429	.416	.910
X30	143.3158	230.276	.464	.910
X31	143.3421	232.934	.340	.912
X32	143.4211	228.899	.436	.910
X33	143.4211	230.034	.424	.910
X34	143.1579	232.893	.412	.910
X35	143.5000	235.068	.357	.911
X36	143.2368	226.294	.593	.908
X37	143.4211	225.548	.604	.908

5.3.5 Summary Item Statistics

Table 5.14 illustrates the mean, minimum, maximum range and variance for all items in the questionnaire.

Table 5.14: Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.983	3.579	4.421	.842	1.235	.039	37

5.4 Summary

This chapter focuses on the system analysis, from the testing and evaluation conducted, the prototype fulfils the requirements needed the online services user. The prototype still needs to be uploaded on Internet for further testing and development and real usage.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This chapter focuses on the study by summarizing and reviewing the findings that found from the study and presenting research contribution to achieve goals according to problem statement and objective. Also the chapter refers to the problems and limitations, and the direction of the future works.

6.1 Conclusion of the Study

As was explained in Chapter one, the objectives of this study is to design and develop an online services system: a Case of Maybank Students' Residential Hall. The prototype helps staff and students to do their demands easily anywhere at any time using an online services system. The system increases the interaction between them.

6.2 Study Contributions

Designing and developing an online services system: a case of Maybank Students' Residential Hall helps the staff and students by gaining an easier way to make their demands by providing them with the necessary functionalities in this system and

increase the communication ways between them. The prototype was developed using ASP.NET with C# in coding the online services system. In this study appeared how the users (staff and students) can save time and effort when they use the system. Microsoft Access database is used to make the database that stores the required information in the system.

6.3 Problems and Limitations

Despite this system allows to the users (staff and students) easier way for efficient interaction, and the many features in the Access database; there are some significant shortcomings in the database of the system, which include the following:

- It is not advisable to run Access on a big company where there are many users of limited records, but can we used quite well in a small to medium company.
- Another limitation of Access is that when an object is deleted the database does not automatically recover the empty space.

6.4 Future Works

The Online services system: a Case of Maybank Students' Residential Hall is to enable the students to communicate with Maybank office more efficient and organized. Future works as listed in the following:

- Expand system functions to cover all students' residential halls at University Utara Malaysia.

- Upload the system to the server of University Utara Malaysia to test it in real world.
- Change the database that used in the system with another database, such as sql server database that is more appropriate with the online applications.

6.5 Recommendations

In my opinion no one can deny the importance of the online services in different aspects of our life. We must make the use of the online services to be applied extensively because it is make everything easy and fast to be done in anywhere and anytime.

It is recommended that similar types of online services be used in other colleges but based on the requirements of each college.

6.6 Summary

This chapter focuses on the prototype contribution to solve the problem concerned with increase the efficient interaction between resident students and students' residential hall staff of Maybank College. After that the chapter focuses on the problems and limitation in this study. Finally future works and recommendations are presented.

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Appendix A: Questionnaire

Template

FACULTY OF ATRS AND SCIENCES

UNIVERSITY UTARA MALAYSIA

Online Services System: a Case of MayBank Students' Residential Hall (Online Services-MSRH)

I am MSc in Information Technology final semester student at University Utara Malaysia.

Currently I am conducting this questionnaire to help me gain an understanding of the user who will use (Online Services-MSRH) at University Utara Malaysia.

This study aims to design and develop a prototype system for MayBank College students' residential hall at UUM to increase the interaction between resident students and MayBank College office. All your information will be held in strictest confidence and it will be used only for research purpose. Your insights a feedback in making this study successful is highly appreciated.

If you have any queries or if you like to know the result of this study, please do contact me at 014-9050075 or through the e-mail

ahmed_75_4@yahoo.com

This questionnaire consists of six sections:

A. Respondent Profile.

B. User Experience.

C. Moving around the Form (navigation, workflow & orientation).

D. Reading the Site (written content)

E: Viewing the Site (layout & presentation)

F: Interaction Design

Thank you for your valuable time and help in completing this Questionnaire.

MSc. IT Candidate

Ahmed H. Said Al Azawei

Questionnaire for Online Services System: a Case of MayBank Students' Residential Hall (Online Services System-MSRH) / UUM

Section A: Respondent Profile.

Please answer the following questions:

User: □ Student

Gender: □ Male □ Female

Educational Background: □Bachelors' Degree □Masters Degree □ Doctoral

□ Others

Does your educational background is related with the information technology (IT)?

□ Yes □ No

Semester: □First □Second □Third □Fourth □Others

Internet Usage: □ Daily □Weakly □Monthly □Others

- Try to respond to all the items.
- Please kindly the best answer suited for you.

1= Strongly disagree

2= Disagree

3= Neutral

4= Agree

5= Strongly agree

Section B: User Experience

Please choose the appropriate number

	Questions	1	2	3	4	5
1	The (Online Services-MSRH) provides me with short cuts to all forms from main page.	○	○	○	○	○
2	The Online Services-MSRH does not use embedded fonts in PDF; it uses the TimesNewRoman fonts in all texts.	○	○	○	○	○
3	All links in the system (Online Services-MSRH) are working.	○	○	○	○	○
4	The spelling and grammar have been reviewed in the system (Online Services-MSRH).	○	○	○	○	○
5	I can print any page in the website on A4 paper.	○	○	○	○	○
6	All forms in the system do not consist of more than one page.	○	○	○	○	○

Section C: Moving Around the Form (Navigation, Workflow & Orientation)

Please choose the appropriate number

	Questions	1	2	3	4	5
1	The (Online Services-MSRH) avoids the using of 'Submit' as I feel this language is too technical, unfriendly or authoritative.	○	○	○	○	○
2	I do not need to read and complete or chose any irrelevant details.	○	○	○	○	○
3	The (Online Services-MSRH) form avoids asking me for details.	○	○	○	○	○
4	The (Online Services-MSRH) minimizes the amount of data that I require to enter.	○	○	○	○	○
5	The (Online Services-MSRH) makes it easy for me to understand the workflow and structure of the form.	○	○	○	○	○
6	The (Online Services-MSRH) provides me with efficient and quick workflow.	○	○	○	○	○

Section D: Reading the Site (Written Content)

Please choose the appropriate number

	Questions	1	2	3	4	5
1	The meaning is clear in all text and labeling that is used throughout the form.	○	○	○	○	○
2	The (Online Services-MSRH) uses a friendly language and it avoids the computer or the technical jargon, (For example, it uses 'send' instead of 'submit').	○	○	○	○	○
3	The (Online Services-MSRH) uses ('required fields' instead of 'mandatory fields').	○	○	○	○	○
4	The (Online Services-MSRH) uses positive language for messages and errors.	○	○	○	○	○
5	The (Online Services-MSRH) does not blame me in error messages.	○	○	○	○	○
6	Each page in (Online Services-MSRH) contains the related data.	○	○	○	○	○
7	The (Online Services-MSRH) forms avoid unnecessary instructions.	○	○	○	○	○
8	The (Online Services-MSRH) uses screen controls such as Drop-downs control and Check boxes control it is easier to me to enter the data.	○	○	○	○	○
9	The (Online Services-MSRH) provides me with reasonable default text.	○	○	○	○	○
10	I do not need to remember any information from a previous page or reenter it again.	○	○	○	○	○

Section E: Viewing the Site (Layout & Presentation)

Please choose the appropriate number

	Questions	1	2	3	4	5
1	The (Online Services-MSRH) avoids the large areas of the complementary colours that can cause eyestrain.	○	○	○	○	○
2	I find the order of the content within each page that supports a workflow that allows me to logically and efficiently complete my tasks.	○	○	○	○	○
3	A page title has a larger font size in (Online Services-MSRH) pages.	○	○	○	○	○

4	The (Online Services-MSRH) uses the red bold text for error in some error messages.	○	○	○	○	○
5	All entry fields or boxes are wide and high enough to allow me to see the information that I have entered.	○	○	○	○	○
6	The (Online Services-MSRH) uses a legible text that supports the screen resolutions.	○	○	○	○	○
7	The (Online Services-MSRH) avoids excessively small font sizes that belong to the blocks of text.	○	○	○	○	○
8	The (Online Services-MSRH) avoids the using of the blocks or rows with the capital or the italic texts.	○	○	○	○	○
9	The (Online Services-MSRH) provides me with good accessibility (The ability to access and complete my demands).	○	○	○	○	○
10	The colour of text and background colour have a sufficient contrast for adequate readability.	○	○	○	○	○

Section F: Interaction Design

Please choose the appropriate number

	Questions	**1**	**2**	**3**	**4**	**5**
1	The (Online Services-MSRH) indicates me if any fields are mandatory.	○	○	○	○	○
2	The (Online Services-MSRH) uses the '*'symbol at the field label for mandatory fields.	○	○	○	○	○
3	The (Online Services-MSRH) has flexibility to check the data for errors while saving the details.	○	○	○	○	○
4	The (Online Services-MSRH) displays the dialog box after choosing the cancel from the form without saving the information. That can be done to confirm the action or allowing me to return back to the application form.	○	○	○	○	○
5	The (Online Services-MSRH) provides me with clear error messages.	○	○	○	○	○

Appendix B: Use Cases Specification

1.0 Admin Add New Students Information

1.1 Brief Description

This use case enables the admin to add new students' information to database of the system.

1.2 Pre-Condition

The admin should login to the system via user name and password.

1.3 The Characteristics of Activation

Event driven (on admin demands)

1.4 Flow of Event

- **Basic Flow**

-The use case begins when the admin select add students.

-The admin insert the information of students. This information's including: matric, name, block name, room number and password.

-The admin can press insert to insert this information to database and the system appears message to tell admin the information inserted.

- **Alternative Flow**

-The admin can press cancel to empty all fields and do not insert information into database; in this case the system appears message to admin to confirm cancel.

- **Exceptional Flow**

Not Applicable.

1.5 Post-Condition

-The admin should login before add students information.

1.6 Rule(S)

- All fields are required and can not duplicate matric of students.

1.7 Constraint(s)

-Not Applicable.

2.0 Admin Update Students Information

2.1 Brief Description

This use case enables the admin to update students' information into database of the system.

2.2 Pre-Condition

The admin should login to the system via user name and password.

2.3 The Characteristics of Activation

Event driven (on admin demands)

2.4 Flow of Event

- **Basic Flow**

  -The use case begins when the admin select update students.

  -The admin update any information of students. This information's including: matric, name, block name, room number and password.

  -The admin press update to update this information into database and the system appears message to tell admin the information updated.

- **Alternative Flow**

  Not Applicable.

- **Exceptional Flow**

  Not Applicable.

2.5 Post-Condition

-The admin should login before add students information.

2.6 Rule(S)

- Not Applicable.

2.7 Constraint(s)

-Not Applicable.

3.0 Admin Delete Students Information

3.1 Brief Description

This use case enables the admin to delete students' information from database of the system.

3.2 Pre-Condition

The admin should login to the system via user name and password.

3.3 The Characteristics of Activation

Event driven (on admin demands)

3.4 Flow of Event

- **Basic Flow**

-The use case begins when the admin select delete students.

-The admin can delete all information of students.

-The admin press delete button to delete this information from database and the system appears message to tell admin the information deleted.

- **Alternative Flow**

Not Applicable.

- **Exceptional Flow**

Not Applicable.

3.5 Post-Condition

-The admin should login before delete students' information.

3.6 Rule(S)

- Not Applicable.

3.7 Constraint(s)

-Not Applicable.

4.0 Admin View Students Information

4.1 Brief Description

This use case enables the admin to view all students' information.

4.2 Pre-Condition

The admin should login to the system via user name and password.

4.3 The Characteristics of Activation

Event driven (on admin demands)

4.4 Flow of Event

- **Basic Flow**

  -The use case begins when the admin select view students.

  -All students' information appears to admin.

  -Admin can order information by using any field of information. Such as name field or matric field.

- **Alternative Flow**

  Not Applicable.

- **Exceptional Flow**

Not Applicable.

4.5 Post-Condition

-The admin should login before view students' information.

4.6 Rule(S)

- Not Applicable.

4.7 Constraint(s)

-Not Applicable.

5.0 Admin Search Students Information

5.1 Brief Description

This use case enables the admin to search about students' information.

5.2 Pre-Condition

The admin should login to the system via user name and password.

5.3 The Characteristics of Activation

Event driven (on admin demands)

5.4 Flow of Event

- **Basic Flow**

  -The use case begins when the admin select search students information.

  -The students' information appears to admin depends on the type of search admin can choose (search by: students matric, block name, room number or room number and block name together).

  -Admin can order, delete or update.

- **Alternative Flow**

  Not Applicable.

• **Exceptional Flow**

Not Applicable.

5.5 Post-Condition

-The admin should login before serach students information.

5.6 Rule(S)

- Admin should specific the field to search depend on it.

5.7 Constraint(s)

-Not Applicable.

6.0 Admin Send New Announcement

6.1 Brief Description

This use case enables the admin to send new announcements to all residential students in Maybank College.

6.2 Pre-Condition

The admin should login to the system via user name and password.

6.3 The Characteristics of Activation

Event driven (on admin demands)

6.4 Flow of Event

• **Basic Flow**

-The use case begins when the admin select add announcement.

-The admin insert the information of announcement. This information's including: title, subject and the date will insert automatically.

-The admin can press send to send this announcement and the system appears message to tell admin the announcement sent successfully.

- **Alternative Flow**

  -The admin can press cancel button to empty all fields and do not send this announcement; in this case the system appears message to admin to confirm cancel.

- **Exceptional Flow**

  Not Applicable.

6.5 Post-Condition

-The admin should login before select send announcement.

6.6 Rule(S)

- The subject field is required.

6.7 Constraint(s)

-Not Applicable.

7.0 Admin Delete Announcement

7.1 Brief Description

This use case enables the admin to delete announcement from database of the system.

7.2 Pre-Condition

The admin should login to the system via user name and password.

7.3 The Characteristics of Activation

Event driven (on admin demands)

7.4 Flow of Event

- **Basic Flow**

  -The use case begins when the admin select delete announcement.

-The admin can delete specific announcement.

-The admin press delete button to delete this announcement from database and the system appears message to tell admin the information deleted.

- **Alternative Flow**

Not Applicable.

- **Exceptional Flow**

Not Applicable.

7.5 Post-Condition

-Not Applicable.

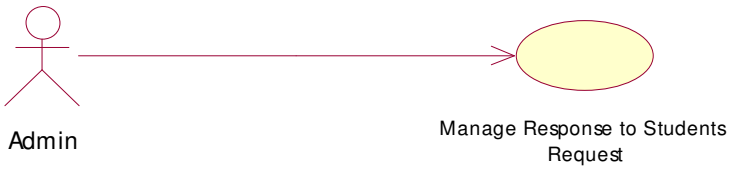
7.6 Rule(S)

- The admin should login before select delete announcement.

7.7 Constraint(s)

-Not Applicable.

8.0 Admin Manage Response to Students request



8.1 Brief Description

This use case enables the admin to view the requests from students and response to it.

8.2 Pre-Condition

The admin should login to the system via user name and password.

8.3 The Characteristics of Activation

Event driven (on admin demands)

8.4 Flow of Event

• **Basic Flow**

-The use case begins when the admin select view request.

-The admin can select any request.

-The admin press answer button to response to the request.

• **Alternative Flow**

Not Applicable.

• **Exceptional Flow**

Not Applicable.

8.5 Post-Condition

- The admin should login before view the requests of students.

8.6 Rule(S)

- Not Applicable.

8.7 Constraint(s)

-Not Applicable.

9.0 Student Send Request

9.1 Brief Description

This use case enables the student to send new request to office of Maybank College.

9.2 Pre-Condition

The student should login to the system via user name and password.

9.3 The Characteristics of Activation

Event driven (on student demands)

9.4 Flow of Event

- **Basic Flow**

  -The use case begins when the student select add request.

  -The student inserts the information about his/her request.

  -The student can press send button to send this request and the system appears message to tell student the request sent successfully.

- **Alternative Flow**

  -The student can press cancel button to empty all fields and do not send this request; in this case the system appears message to student to confirm cancel.

- **Exceptional Flow**

  Not Applicable.

9.5 Post-Condition

-The student should login before select send request.

9.6 Rule(S)

- At least the student must choose one field and send the request.

9.7 Constraint(s)

-Not Applicable.

10.0 Student View Response

10.1 Brief Description

This use case enables the student to view the response of admin to his/her request.

10.2 Pre-Condition

The student should login to the system via user name and password.

10.3 The Characteristics of Activation

Event driven (on student demands)

10.4 Flow of Event

- **Basic Flow**

  -The use case begins when the student select view response.

  -The system views student the latest response to his/her request.

- **Alternative Flow**

  Not Applicable.

- **Exceptional Flow**

  Not Applicable.

10.5 Post-Condition

-The student should login before select view response.

10.6 Rule(S)

- Not Applicable.

10.7 Constraint(s)

-Not Applicable.

11.0 Student View Announcement

11.1 Brief Description

This use case enables the student to view the announcement sent from the office of Maybank College.

11.2 Pre-Condition

The student should login to the system via user name and password.

11.3 The Characteristics of Activation

Event driven (on student demands)

11.4 Flow of Event

- **Basic Flow**

  -The use case begins when the student select view announcement.

  -The system views student the latest announcement.

- **Alternative Flow**

  Not Applicable.

- **Exceptional Flow**

  Not Applicable.

11.5 Post-Condition

-The student should login before select view announcement.

11.6 Rule(S)

- Not Applicable.

11.7 Constraint(s)

-Not Applicable.

12.0 User Change Password

12.1 Brief Description

This use case enables the admin and student to change password.

12.2 Pre-Condition

The admin or student should login to the system via user name and password.

12.3 The Characteristics of Activation

Event driven (on user demands)

12.4 Flow of Event

- **Basic Flow**

  -The use case begins when the user select change password.

  -The user enters current password and new password.

  -The user press change password button to change current password with new password into database and the system appears message to tell user the password changed successfully.

- **Alternative Flow**

  Not Applicable.

- **Exceptional Flow**

  Not Applicable.

12.5 Post-Condition

-The user should login before change password.

12.6 Rule(S)

- All fields are required.

-User should enter password at least six characters.

12.7 Constraint(s)

-Not Applicable.

Appendix C: User Manual of Online Services System of Maybank Students' Residential Hall (Online Services-MSRH)

1.0 Starting with the System (Students Function):

A) Home Page

Home page represents the interface for the system. In this page the user (Admin or Student) can press on login link to go to login page.

Figure 1: Home Page

B) User Login Page

In this page user enters the user name and password to get permeation to his/her page.

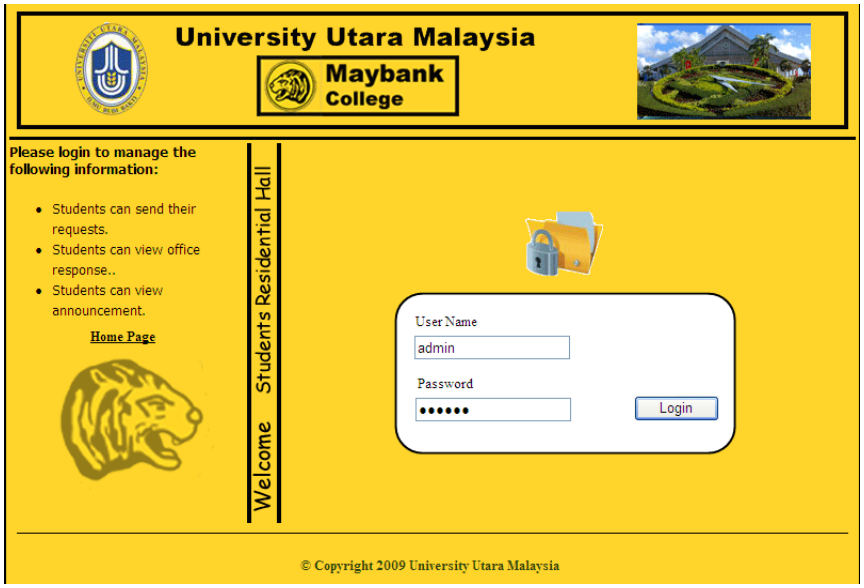


Figure 2: User Login Page

C) Student Page

The student page represents the home page to the student after login. This page contains a brief description about functionalities of the student.

Figure 3: Student Page

D) Student Add Request

This page contains the form to send students' request to office of Maybank College.

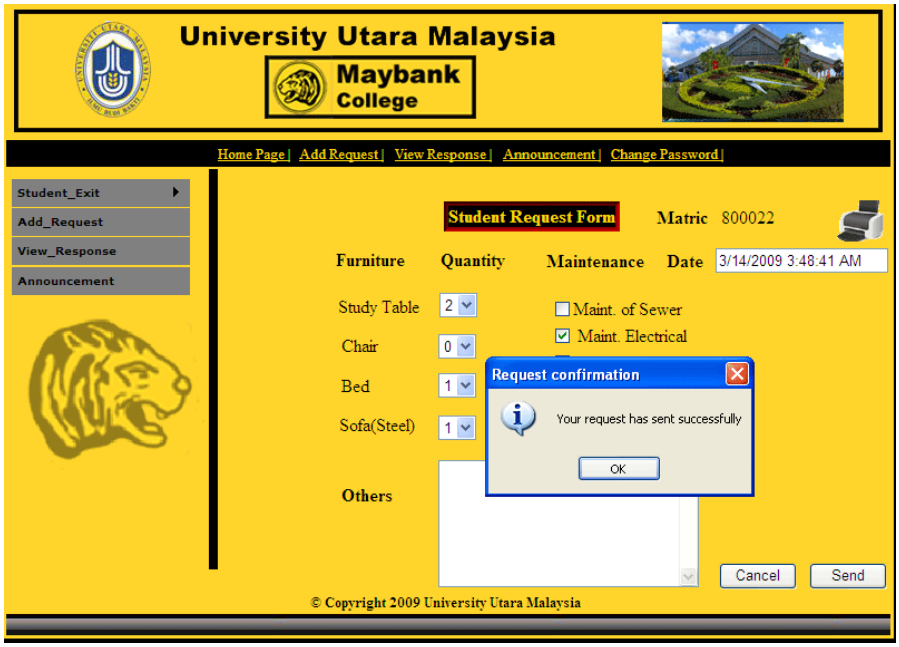


Figure 4: Student Request Page

E) View Response Page

From this page student can view the response of office to his/her request.

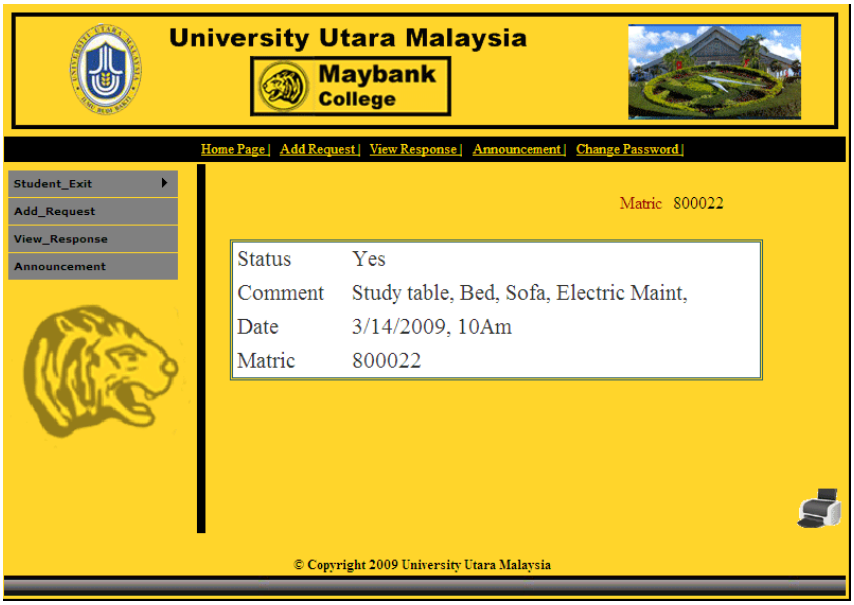


Figure 5: View Response Page

F) View Announcement

The students can view the announcement sent from office of Maybank College. All residential students in Maybank College can view this announcement.

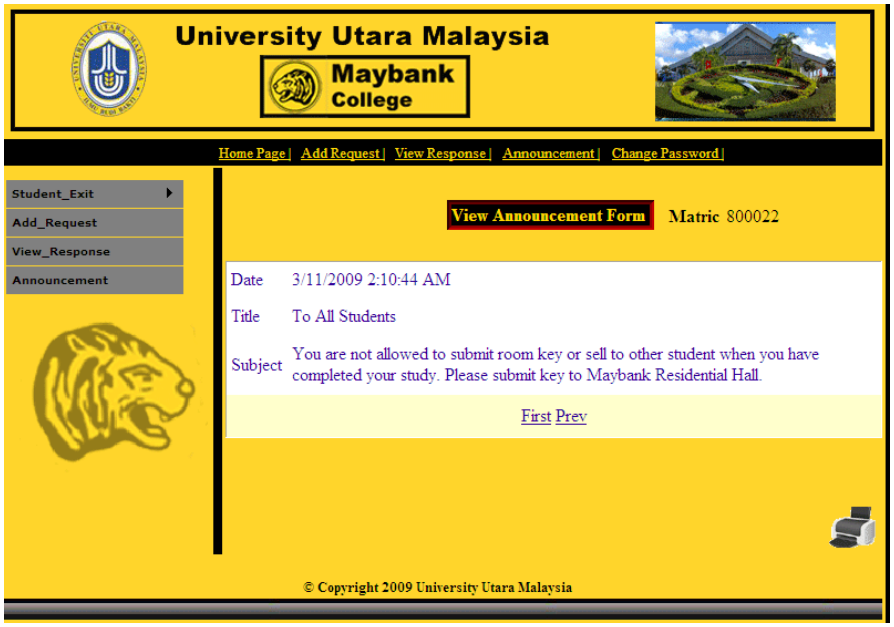


Figure 6: View Announcement Page

G) Student Change Password Page

The students can change the password from this page.

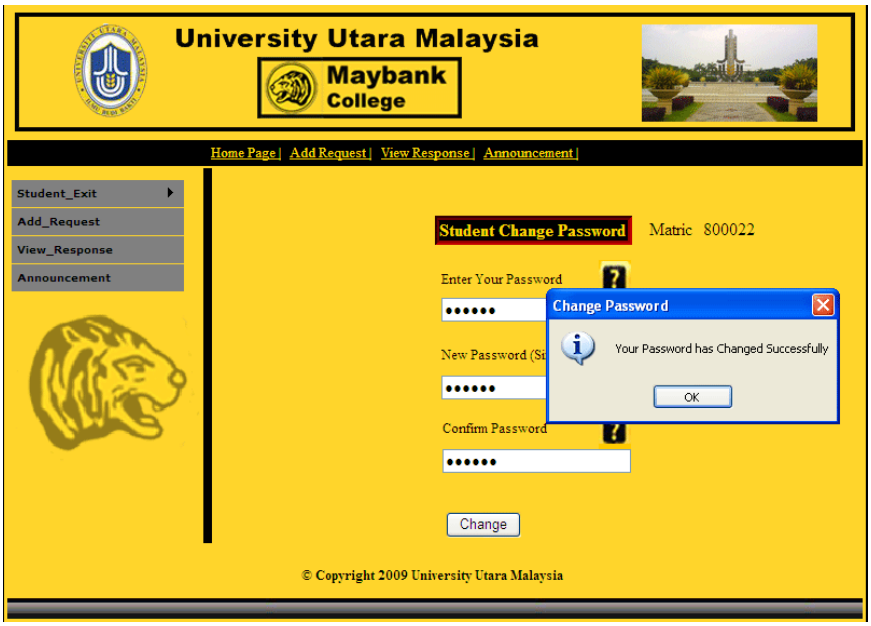


Figure 7: Student Change Password Page

2.0 Starting with the system (Admin Function):

A) Admin Page

Admin page represents the home page to the admin after login. This page contains a brief description about the functionalities of the admin.

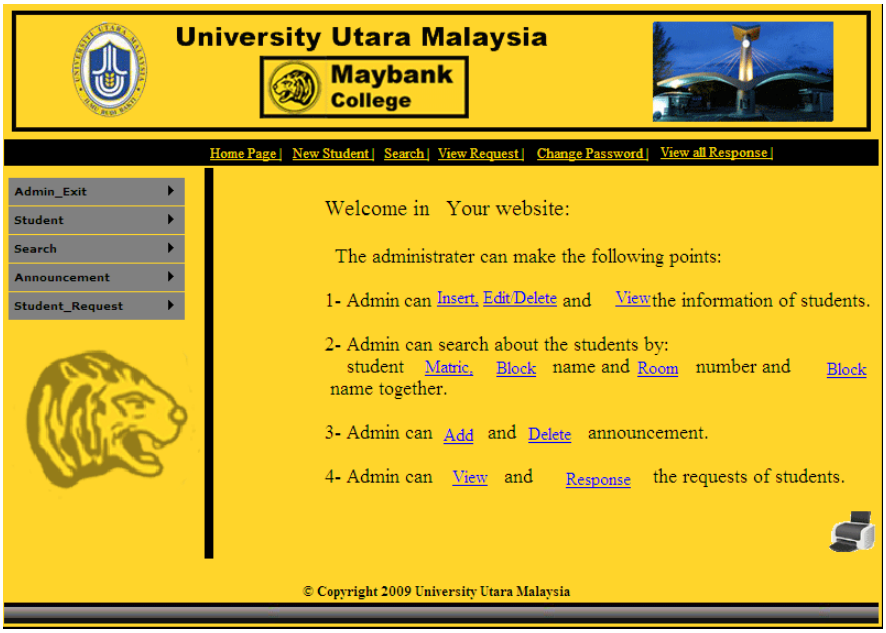


Figure 8: Admin Page

B) Add New Students Page

In this page admin can add the students' information.

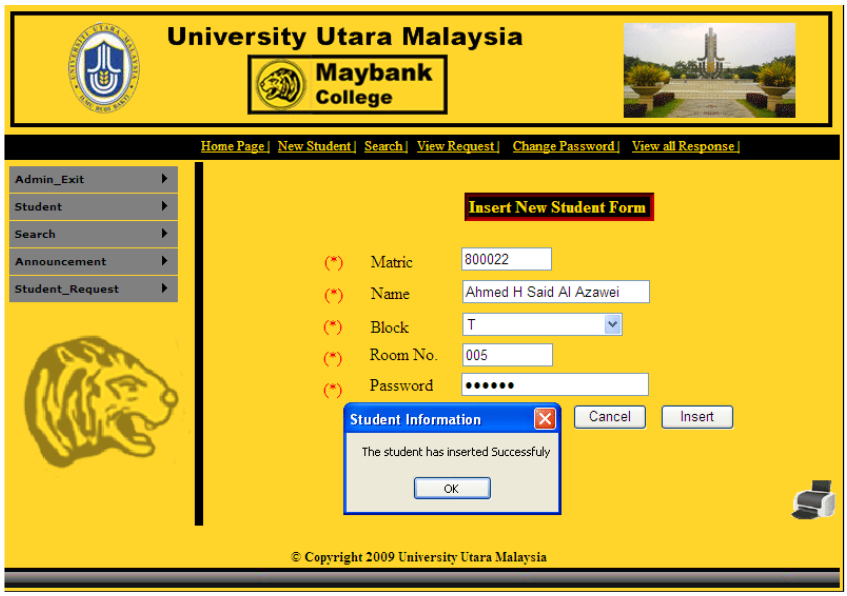


Figure 9: Add New Students Information Page

C) Update Student Information Page

Admin can update all students' information through this page.

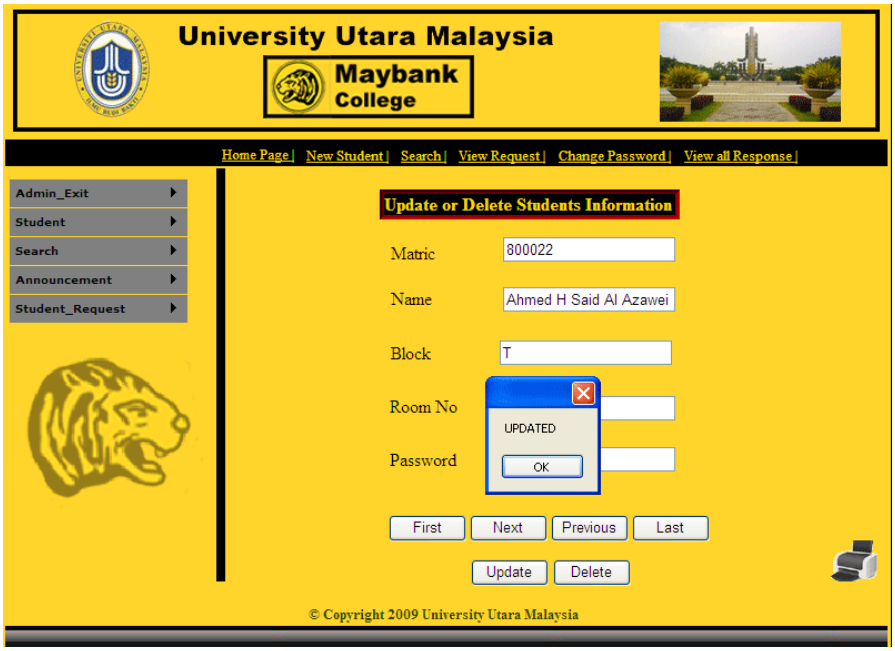
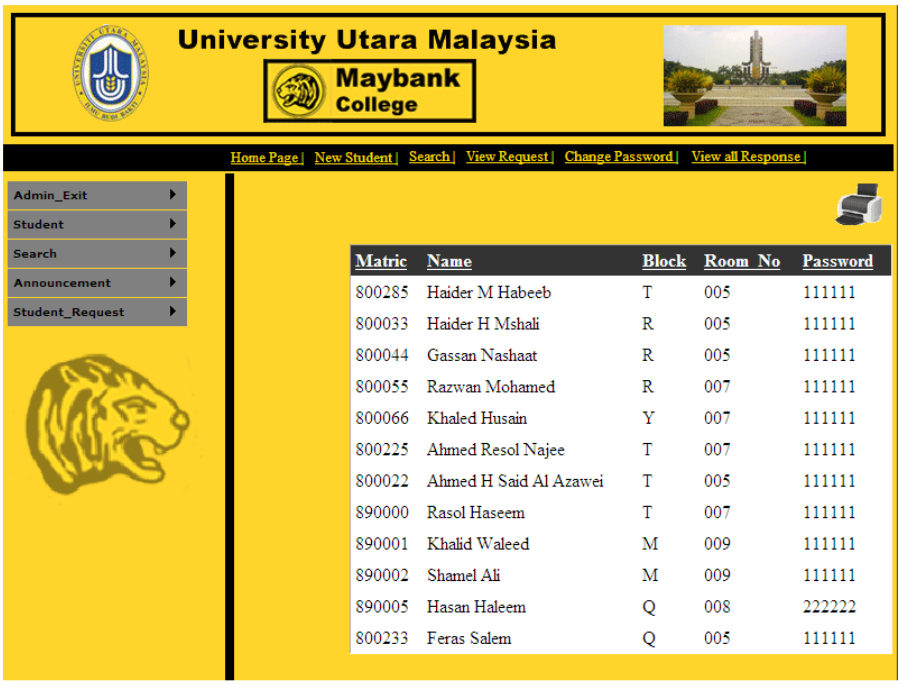


Figure 10: Update Students Information Page

D) View Students Information

In this page admin can view the students' information.



Matric	Name	Block	Room No	Password
800285	Haider M Habeeb	T	005	111111
800033	Haider H Mshali	R	005	111111
800044	Gassan Nashaat	R	005	111111
800055	Razwan Mohamed	R	007	111111
800066	Khaled Husain	Y	007	111111
800225	Ahmed Resol Najee	T	007	111111
800022	Ahmed H Said Al Azawei	T	005	111111
890000	Rasol Haseem	T	007	111111
890001	Khalid Waleed	M	009	111111
890002	Shamel Ali	M	009	111111
890005	Hasan Haleem	Q	008	222222
800233	Feras Salem	Q	005	111111

Figure 11: View Students Information Page

E) Search by Matric Page

Admin can find students information by using matric to search about it.

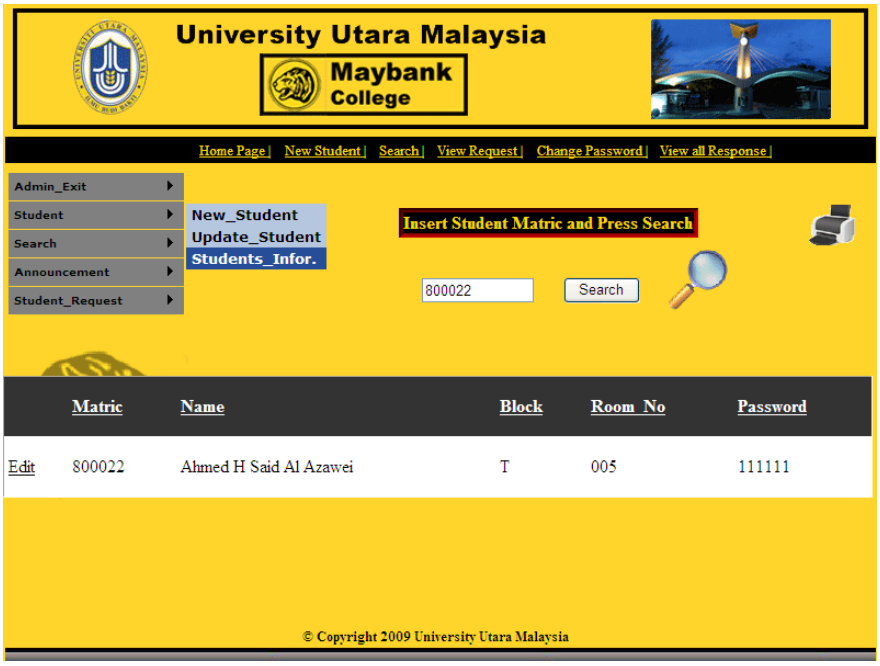


Figure 12: Search Students Information by Matric Page

F) Search by Room No Page

Admin can find students information by using his/her room number to search about it.

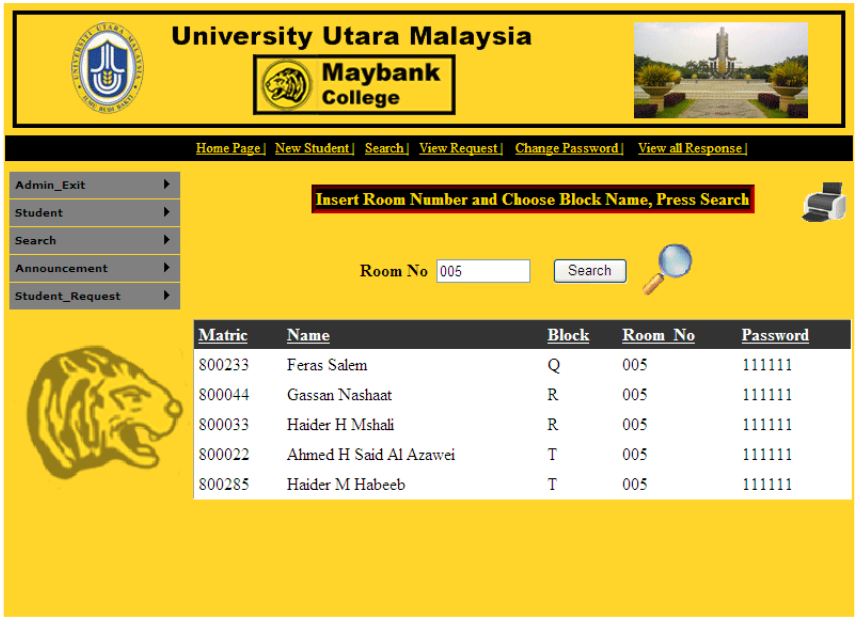


Figure 13: Search Students Information by Room No Page

G) Search by Block Name Page

Admin can find students information by using his/her block name to search about it.

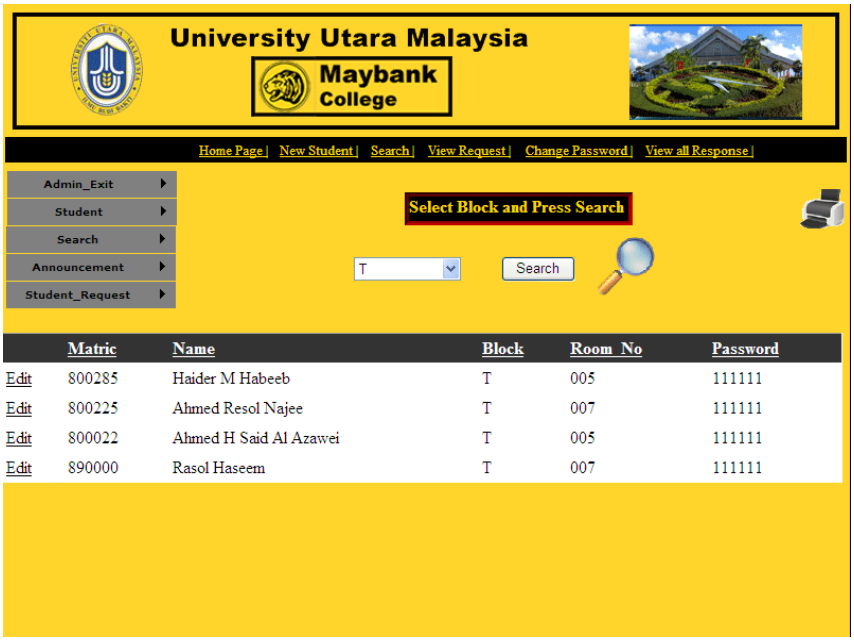


Figure 14: Search Students Information by Block Name Page

H) Search by Block Name and Room No Page

Admin can find students' information by using his/her block name and room number to search about it.

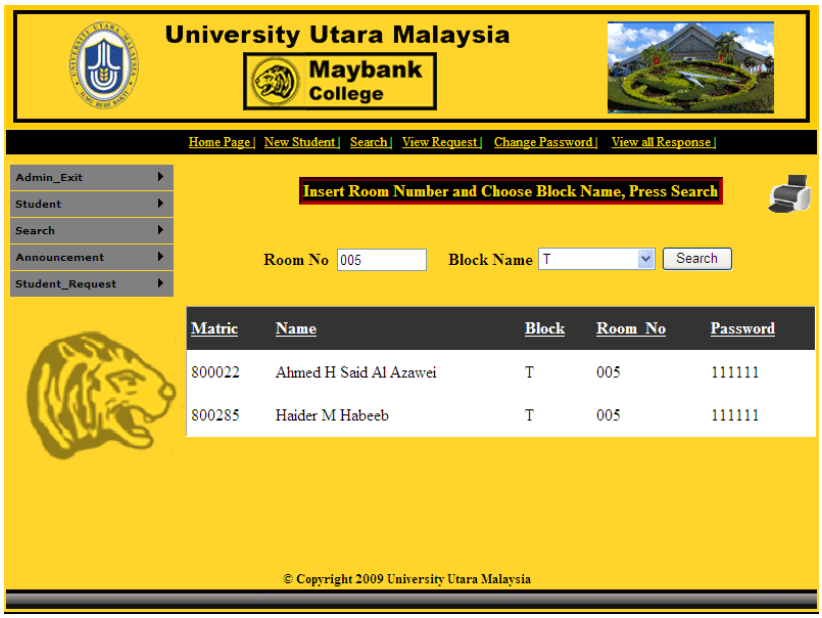


Figure 15: Search Students Information by Block Name and Room Number Page

I) Send New Announcement Page

Admin can send new announcement to all residential students through this page.

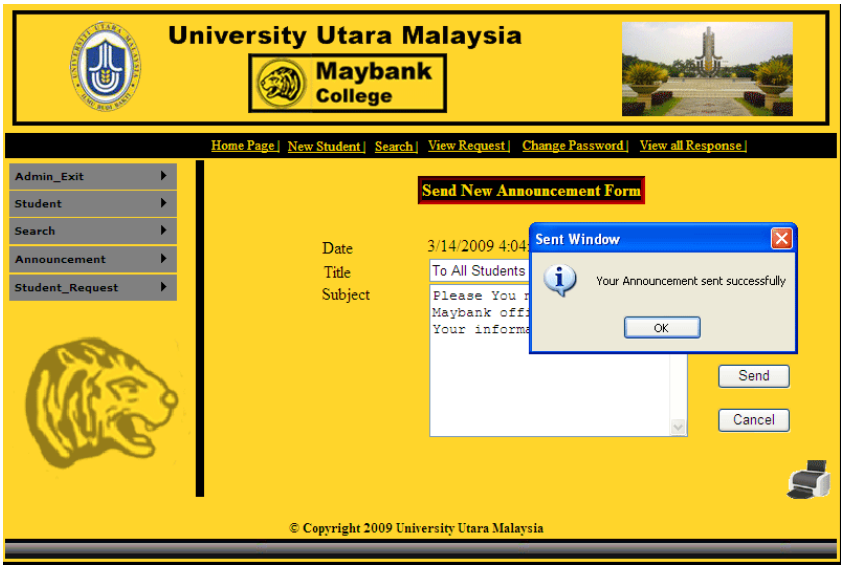


Figure 16: Send New Announcement Page

J) Delete Announcement Page

Admin can delete old announcement from this page.

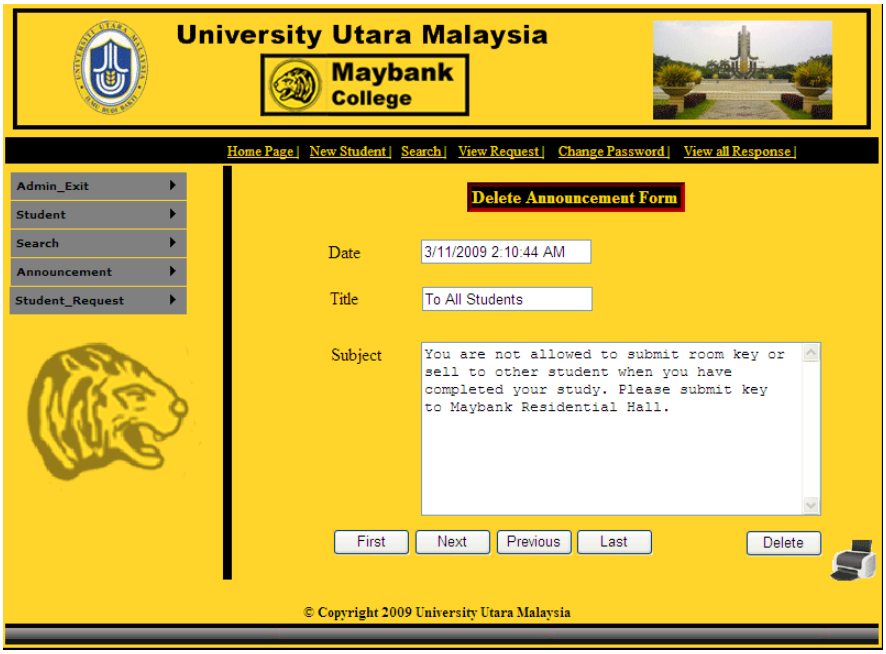


Figure 17: Delete Announcement Page

K) View Request Page

Admin can view all students' requests and response to these requests.

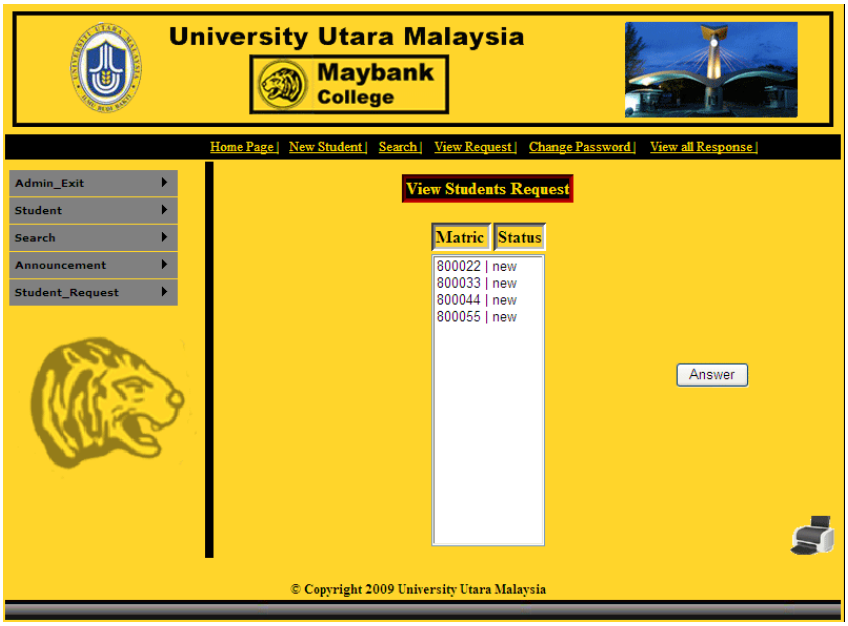


Figure 18: View Students' Requests Page

L) Response to Students' Request Page

Admin can response to students' requests from this page.

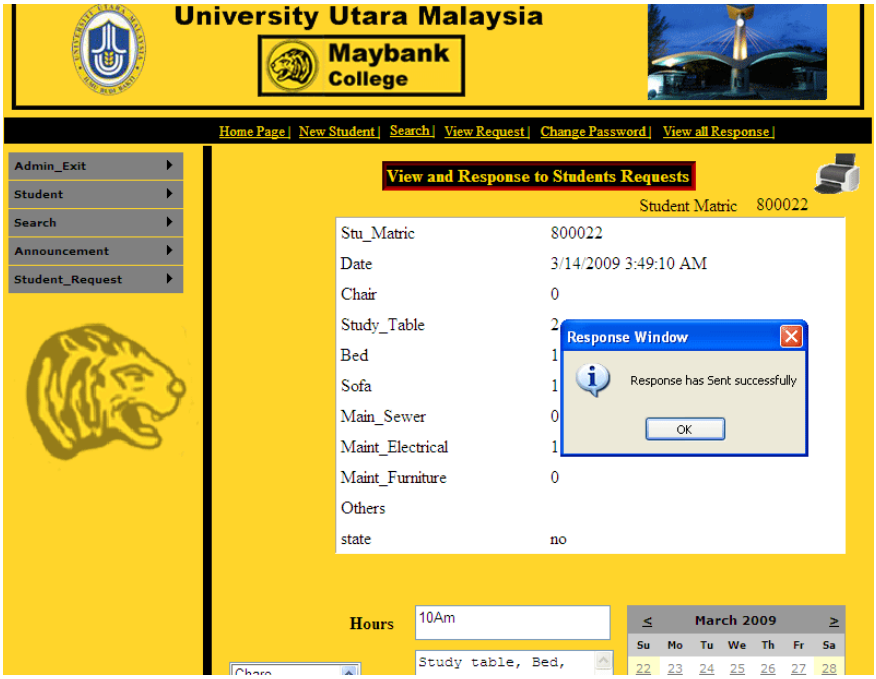


Figure 19: Response to Students' Requests Page

M) Admin Change Password Page

Admin can change the password from this page.

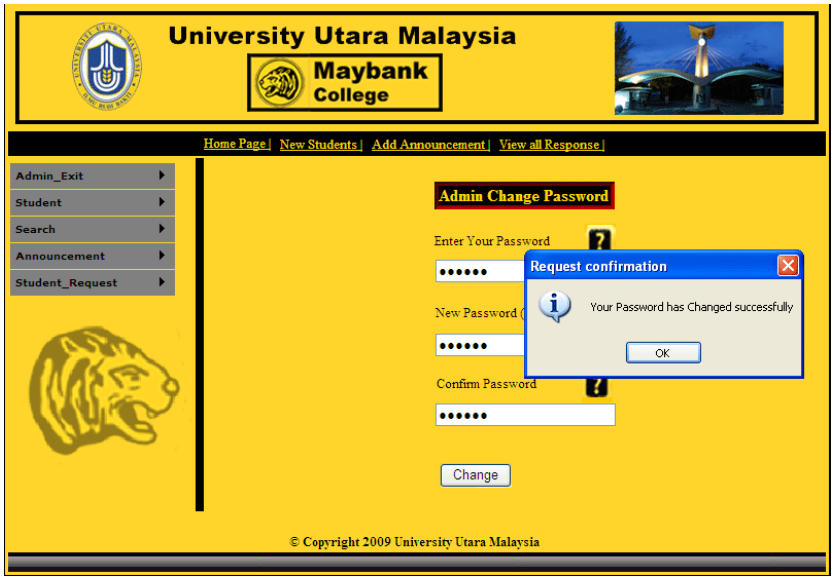


Figure 20: Admin Change Password Page

Appendix D: The Interview with the principal of Maybank Residential Hall

1) Principal Recommendation Letter:

UNIVERSITI UTARA MALAYSIA

06010 UUM Sintok, Kedah Darul Aman. Malaysia. Tel: 604 - 928 4000

Recommendation Letter

To Whom It May Concern

We should like to mention that the student **Ahmed H. Said Al Azawei** (Master student- information technology (IT)) has collected all the informations regarding the Maybank Students' Residential Hall at UUM. In addition, the researcher was very cooperative to follow all the instructions and the procedures followed at the Maybank College. In order to assist him to accomplish his project we supported him with the required valuable information.

However, we confirm the "Online Services System" was developed to Maybank College has benefits and usefulness to both parties in order to improve the interaction between the Maybank College and the resident students.

Thanks and Appreciation

Best Regards

Name: MEJAR HJ AZIZAN HJ HUSAIN

Position: Principal
Maybank Residential Hall
Universiti Utara Malaysia

Date: 06/04/09

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2) **The questions has been presented to the principal in Interview and his answers were:**

1. Do you think that the system facilitate work of the Students' Residential Hall and at the same time offered the student an easier way of an online services?
Answer:
Of course yes, and I hope it will make works much used faster and effective.
2. Do you think that the students will get benefit from system especially who reside in Maybank College?
Answer:
I am sure; student will benefits a lot of by using online services linked to Maybank residential Hall.
3. Does the system provide useful information for the manager?
Answer:
Manager need not have to see face to face with the student.
4. Do you think that the system provides user interface guidelines which are easier to use than the manual system?
Answer:
I found out that the system is very uses friendly interfaces, symbol comprehensive and practical.
5. Can the system be considered as a computerized system to facilitate work of staff?
Answer:
Yes, is not really technical but, it is ICT base work environment.